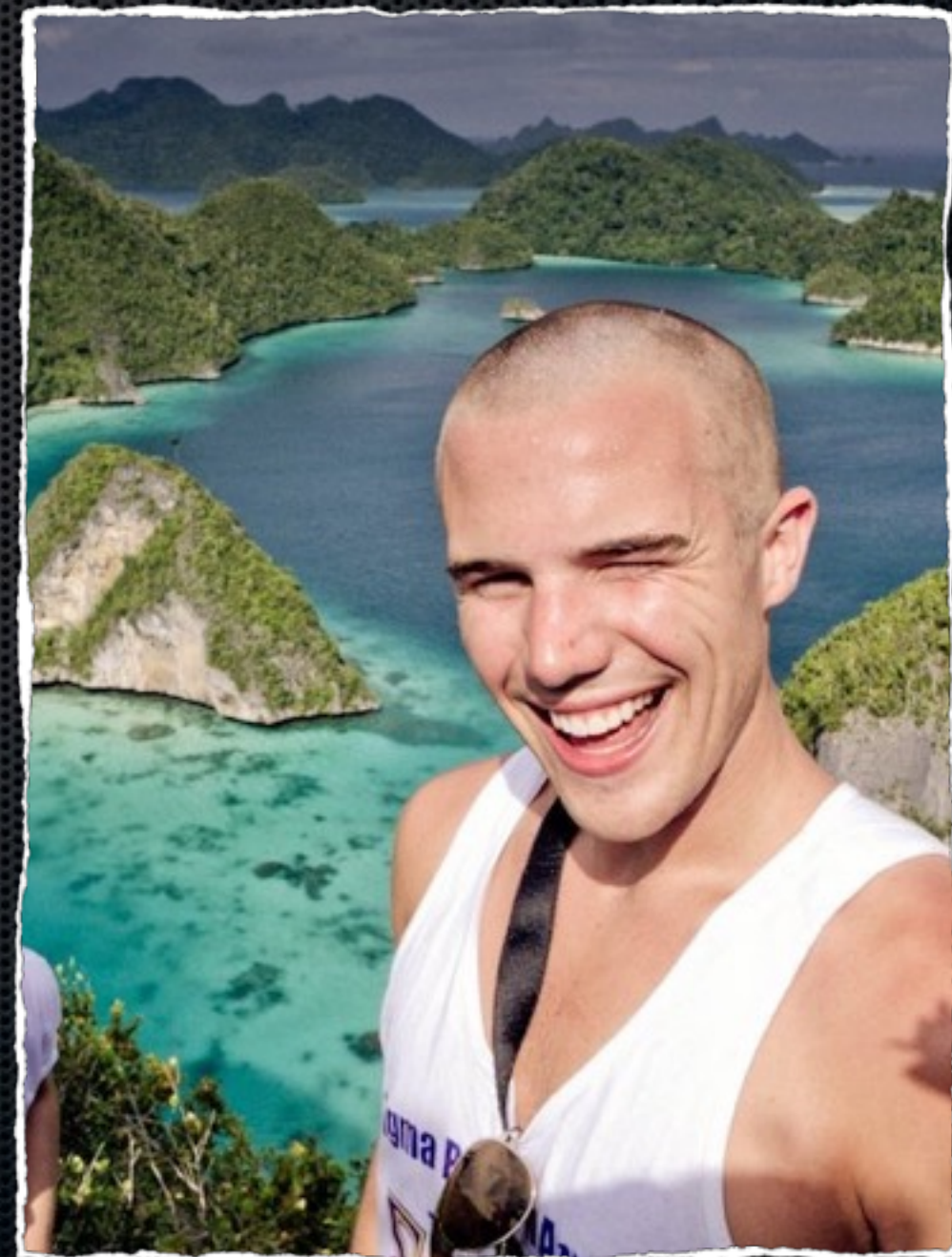


Taylor Barrett-Wilsdon

Taylor was born in Seattle, WA and moved to the Bay Area in six years ago to attend Santa Clara University. Leaving his degree in history behind to pursue his passion for technology, he moved to Berkeley and went to work at the Oakland-based consulting firm and MSP Xantrion.

Realizing his interests laid in OS X and Linux based systems, he moved to San Francisco accepted a position at Yelp in 2014. He is now the IT Lead for the newly minted San Francisco Sales office in the South of Market area.

Taylor is an avid traveller, photographer and automotive enthusiast. He spends his time exploring the world and trying to learn what he can along the way.



Using OS Resources to Diagnose Troubles

Presentation Focus

- Investigation
 - Troubleshooting and fault identification
 - Isolating the problem
- Analysis
 - Pre-boot tools
 - OS X GUI tools
 - Command Line Tools and the Terminal
- Diagnosis
 - Technique
 - Examples

Using boot timing to troubleshoot issues

- What boot stages are important to troubleshooting
- How do you determine which stage you are in?
- What does that tell you?
- Why does it matter which stage you're in?

OS X System Boot Stages

- Firmware
- Booter
- Kernel
- launchd
- loginwindow
- User Environment Setup

Boot Failure Examples



Could not load boot.efi

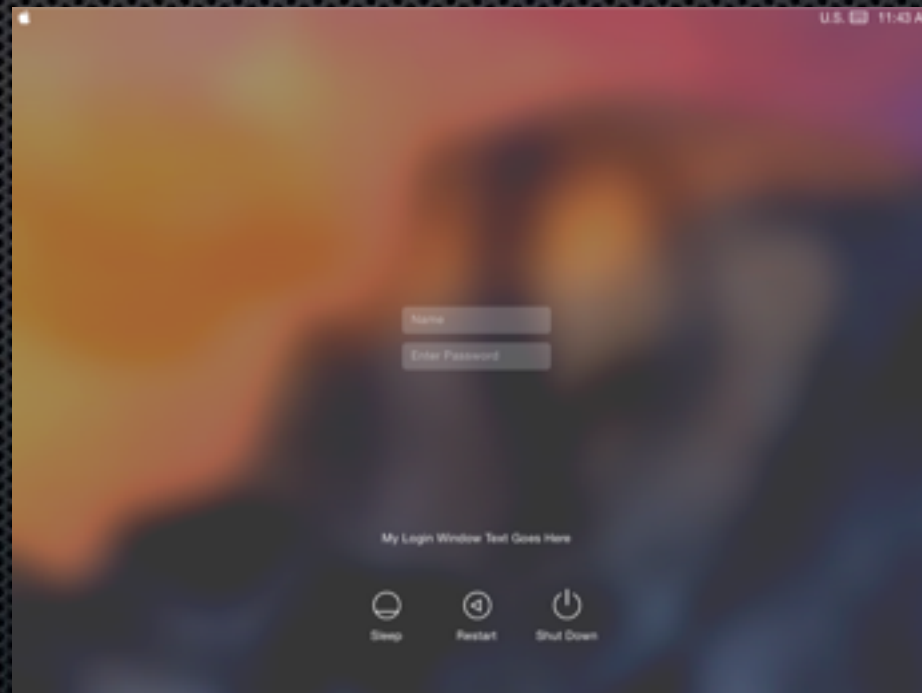
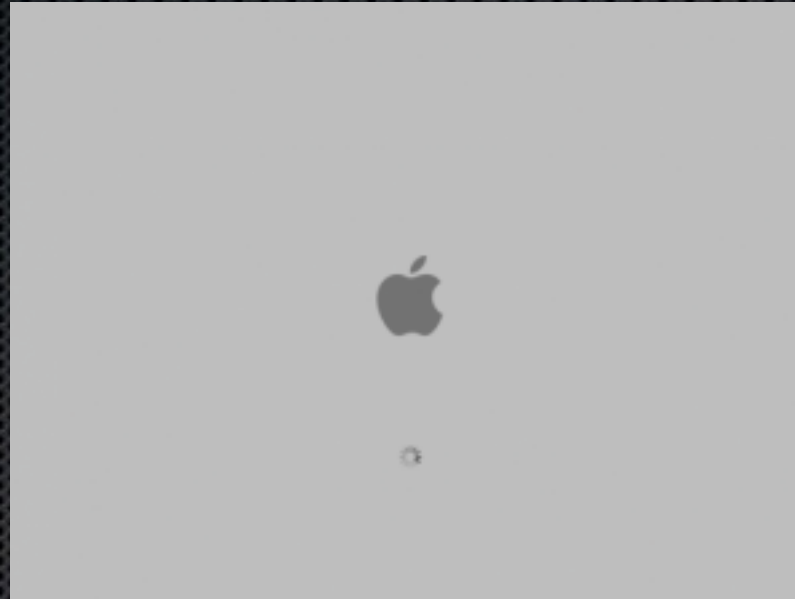


Looking for booter/kernel on netboot server



No bootable device found

Kernel, launchd and loginwindow Stages



launchd explained, how it starts up and keeps things running

- System level
- Shared Library level
- User level
- launchagents vs. launchdaemons
- Things you can do - creating a LaunchDaemon
- For more information, visit:
- https://developer.apple.com/library/mac/documentation/MacOSX/Conceptual/BPSystemStartup/Chapters/CreatingLaunchdJobs.html#//apple_ref/doc/uid/10000172i-SW7-BCIEDDBJ

Startup Shortcuts

- Common terms
- Boot techniques and shortcuts
- Keyboard commands
 - <http://support.apple.com/en-us/HT201255>

Startup Shortcuts

- To boot from a CD/DVD, press and hold “C”
- To start NetBoot, “N”
- To start in Target Disk Mode, “T”
- To use the Apple Diagnostics/Hardware test, “D”
- To enter recovery tools, Command (⌘) and “R”
- To manually select a startup disk, “Option”
- To reset PRAM, Command, Option, “P” and “R”
- To start in Verbose Mode, Command and “V”
- To start in Single User Mode, Command and “S”
- To start in Safe Mode, “Shift”

Startup Disk, Netboot and Target Disk Mode

- Holding Option during startup will allow manual startup disk selection
- Doing the same with the “N” key will launch NetBoot
- Holding the “T” key will initialize Target Disk Mode

Safe Mode, Single User Mode and Verbose Mode

- Holding Shift will start in Safe Mode
- Holding Command and “V” will launch Verbose Mode
- Command and “S” will start in Single User Mode
 - fsck, mount, passwd,

Boot Stages, Boot Tones, and Startup Keyboard Shortcuts

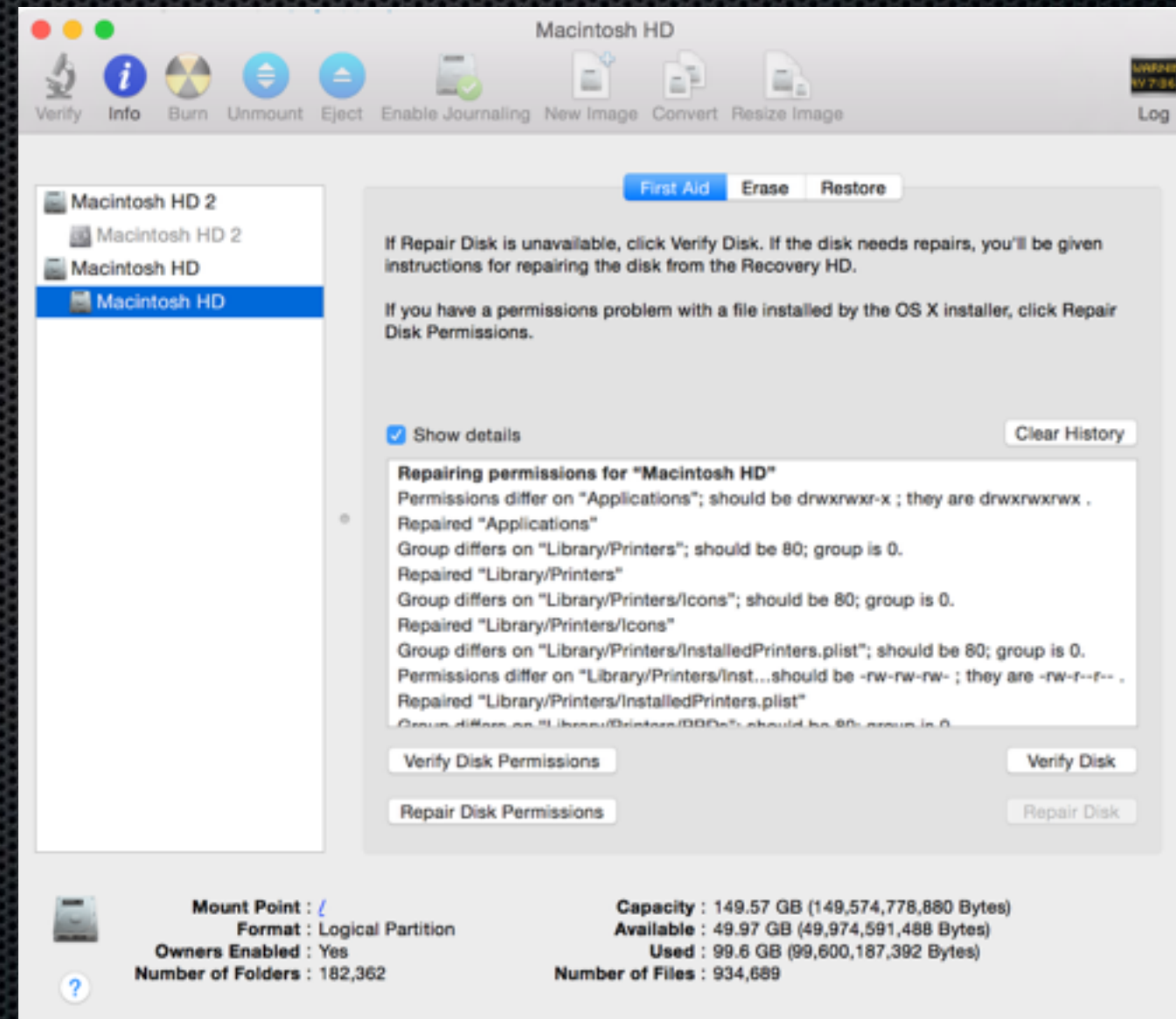
- Boot Stages
<https://support.apple.com/en-us/HT2674>
- Boot Tones
<https://support.apple.com/en-us/HT202768>
- Startup Keyboard Shortcuts
<http://support.apple.com/en-us/HT201255>

Binary method of troubleshooting

- Grouping items to narrow the scope of the issue
- Reducing environmental variables
- Identifying issues as user level or system level

Disk Utility and Repairs

- Repairing permissions
- Issues using disk utility
- Apple-originated objects/receipts
- Repairs through the operating system recovery partition and command line (diskutil)

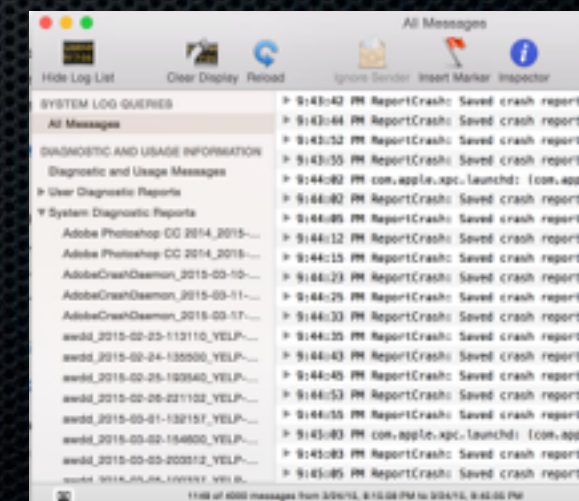
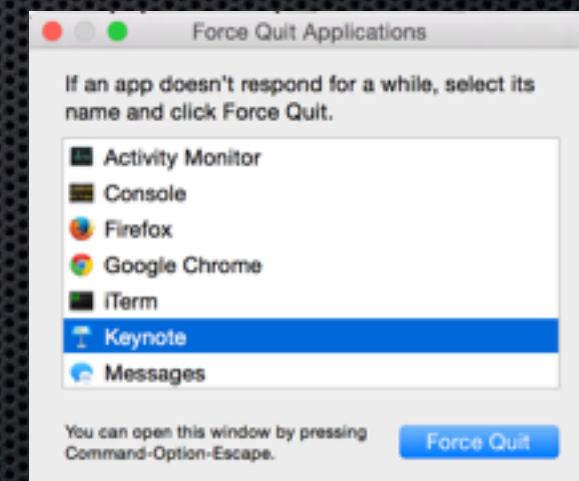
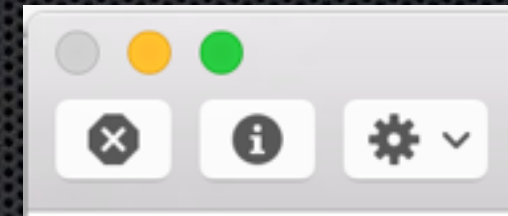


Recovery Partition

- What do you do if one doesn't exist?
- Having a portable recovery partition (e.g., USB drive)
- Recovery Disk Assistant and createinstallmedia
- Password reset utility to reset a user's password
- Using network utility from the recovery partition to troubleshoot network issues outside of the boot OS.
- <https://support.apple.com/en-us/HT201372>

Difference between a Hang and a Crash

- Define an application hang
- Define an application crash
- How to troubleshoot each

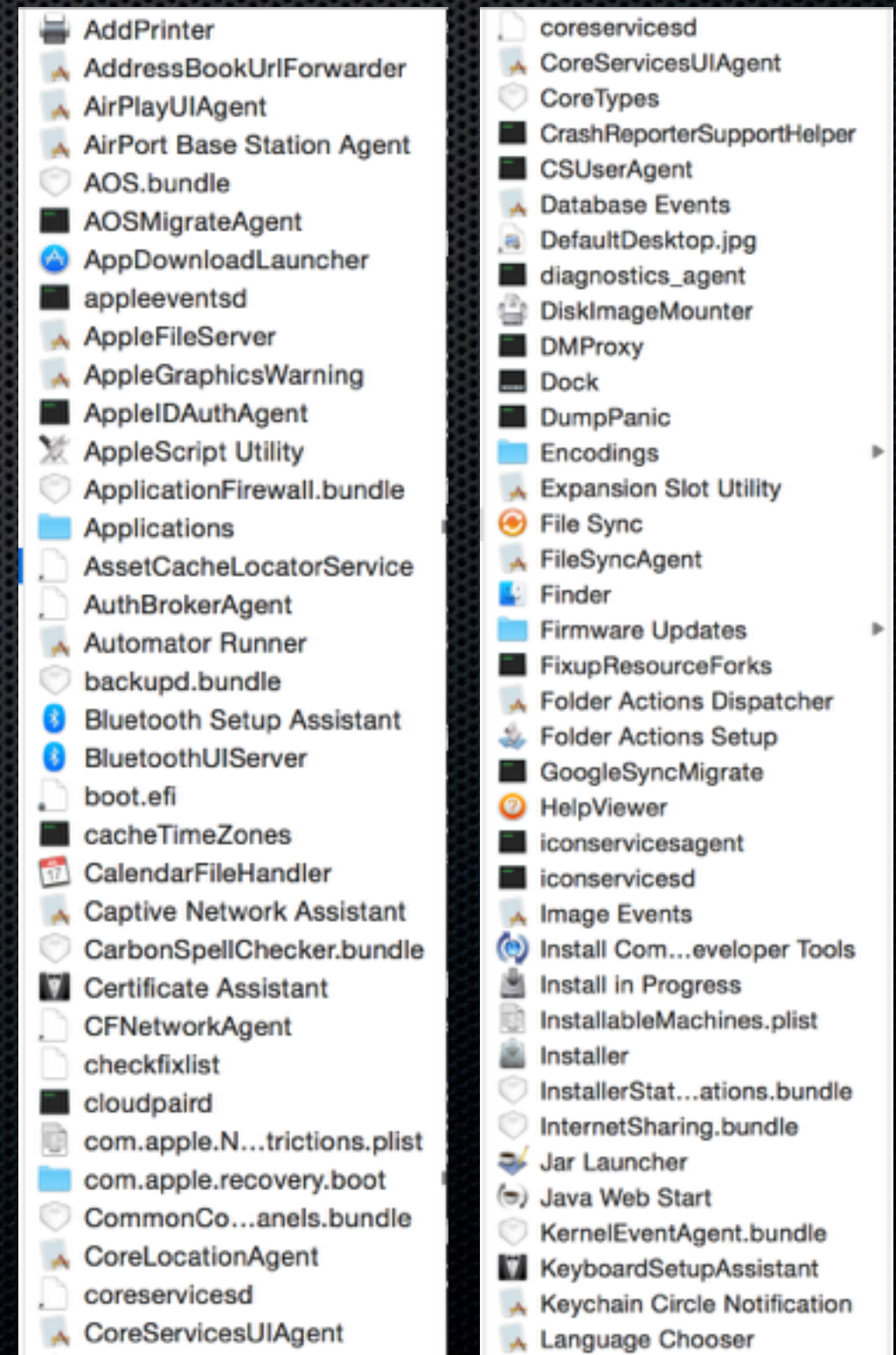


System Console

- Log locations: what's the difference between the different locations
- About reading logs.
- Google is your friend.
- Note that sometimes logs are not available in console
- Notes on using logs for troubleshooting, search terms, use warn, fail, error, etc...

Utilities moved from the Utilities Folder

- /System/Library/CoreServices/Applications/
- What else is in /System/Library/CoreServices/
- What to use, what to avoid



CoreServices Tools

- Directory Utility



- Wireless Diagnostics

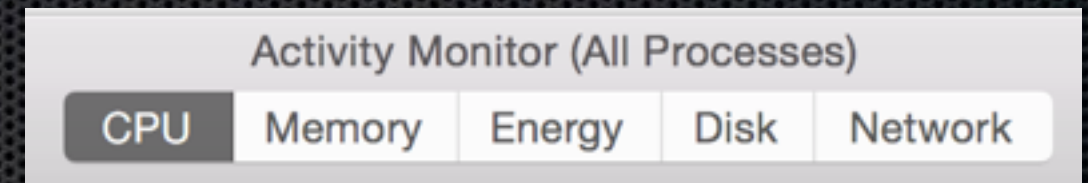


- Network Utility



Activity Monitor

- What's the command line equivalent of this tool?
- Troubleshooting Server specific concerns with Activity Monitor
- Finding the “pigs”
 - CPU
 - Memory
 - Energy
 - Disk
 - Network



tbarrett — top — top — top — 80x24

Processes: 287 total, 2 running, 16 stuck, 269 sleeping, 1679 threads 22:18:09
Load Avg: 1.82, 2.05, 2.16 CPU usage: 4.33% user, 3.73% sys, 91.92% idle
SharedLibs: 2100K resident, 0B data, 0B linkedit.
MemRegions: 84431 total, 7562M resident, 172M private, 2144M shared.
PhysMem: 16G used (1708M wired), 163M unused.
VM: 715G vsize, 1026M framework vsize, 0(0) swapins, 0(0) swapouts.
Networks: packets: 677407/756M in, 622881/73M out.
Disks: 529238/8217M read, 457345/12G written.

PID	COMMAND	%CPU	TIME	#TH	#WQ	#PORT	MEM	PURG	CMPS	PGRP
11322	screencaptur	1.0	00:00.09	8	6	54	2244K	20K	0B	343
11321	top	3.1	00:00.30	1/1	0	20	3028K	0B	0B	11321
11286	zsh	0.0	00:00.10	1	0	15	2140K	0B	0B	11286
11285	login	0.0	00:00.12	5	3	31	1368K	0B	0B	11285
11283	Terminal	0.4	00:00.27	15	9	208	16M	16K	0B	11283
11282	Google Chrom	0.3	00:01.01	13	4	103	70M+	2160K	0B	2747
11275	top	3.2	00:00.88	1	0	17	4240K	0B	0B	11275
11271	QuickLookUIH	0.0	00:00.08	4	2	121	8324K	0B	0B	11271
11270	kcm	0.0	00:03.76	6	5	30	1344K	0B	0B	11270
11269	mdworker	0.0	00:00.02	3	0	57	1912K	0B	0B	11269
11268	QuickLookSat	0.0	00:00.16	2	0	40	3144K	0B	0B	11268
11266	quicklookd	0.0	00:00.14	4	0	88	4892K	0B	0B	11266
11265	ReportCrash	0.0	00:01.32	5	2	52-	5140K-	0B	0B	11265
11248	CVMCompiler	0.0	00:00.08	2	1	28	11M	0B	0B	11248

Command Line Tools to know how to use

- man
- ifconfig
- networksetup
- tcpdump [<https://support.apple.com/en-us/HT202013>]
- lsof
- top
- nettop
- nslookup
- dig

```
tbarrett@yelp-tbarrett:~|master$ dig google.com

; <<>> DiG 9.8.3-P1 <<>> google.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 6197
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 0

;; QUESTION SECTION:
;google.com.                IN      A

;; ANSWER SECTION:
google.com.                 105     IN      A      216.58.192.46

;; Query time: 15 msec
;; SERVER: 192.168.1.1#53(192.168.1.1)
;; WHEN: Tue Mar 24 22:30:39 2015
;; MSG SIZE rcvd: 44
```

```
tbarrett — top — top — top — 80x24

Processes: 293 total, 5 running, 14 stuck, 274 sleeping, 1520 threads 22:31:35
Load Avg: 2.03, 2.38, 2.32 CPU usage: 12.80% user, 6.40% sys, 80.79% idle
SharedLibs: 2100K resident, 0B data, 0B linkedit.
MemRegions: 85425 total, 7690M resident, 171M private, 2059M shared.
PhysMem: 16G used (1715M wired), 96M unused.
VM: 730G vsize, 1026M framework vsize, 0(0) swapins, 0(0) swapouts.
Networks: packets: 696213/779M in, 640113/75M out.
Disks: 535296/8362M read, 471310/13G written.
```

PID	COMMAND	%CPU	TIME	#TH	#WQ	#PORT	MEM	PURG	CMPRS	PGRP
12193	ReportCrash	0.0	00:00.16	6	3	49+	4192K+	0B	0B	12193
12191	screencaptur	1.5	00:00.10	2	0	46-	2184K-	20K	0B	343
12190	top	3.0	00:00.34	1/1	0	21+	3580K	0B	0B	12190
12148	kcm	0.0	00:01.35	4	3	26	1244K	0B	0B	12148
12117	QuickLookSat	0.0	00:00.25	2	0	40	3160K	0B	0B	12117
12116	quicklookd	0.0	00:00.15	4	0	89	4640K	0B	0B	12116
11985	zsh	0.0	00:00.09	1	0	15	2296K	0B	0B	11985
11984	login	0.0	00:00.01	2	0	26	1380K	0B	0B	11984
11980	nettop	0.8	00:00.81	6	5	24-	2560K	0B	0B	11980
11883	zsh	0.0	00:00.07	1	0	15	2232K	0B	0B	11883
11882	login	0.0	00:00.01	2	0	26	1292K	0B	0B	11882
11873	Google Chrom	0.0	00:01.02	10	0	92	63M	428K	0B	2747
11835	bash	0.0	00:00.01	1	0	15	664K	0B	0B	11835
11775	zsh	0.0	00:00.07	1	0	15	2284K	0B	0B	11775

More Resources

- <https://support.apple.com/en-us/HT202768> [Startup Tones]
- <https://support.apple.com/en-us/HT201255> [Startup Key Combos]
- <https://support.apple.com/en-us/HT2674> [Startup Sequence]
- <http://jrause.com/blog/?p=383> [OSX Troubleshooting]
- <https://support.apple.com/en-us/HT204325> [Startup Issues]
- <https://developer.apple.com/library/mac/documentation/MacOSX/Conceptual/BPSystemStartup/Chapters/CreatingLaunchdJobs.html> [launchd documentation]
- <https://support.apple.com/en-us/HT201372> [Creating Bootable Installers]
- <https://support.apple.com/en-us/HT202790> [Network Utility]

Questions?



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