Miguel Chavez

Managing tech support issues from medium-sized businesses down to home users for over 20 years is no mean feat, but having a sense of humor helps.

Unfortunately Miguel is still working on that.

Starting in the go-go desktop publishing boom in the 90's here in NYC, Miguel cut his teeth on Apple Macintosh IIci's and 44MB Syquest disks. Before that he cut school to play on TRS-80 Model III's at the recently folded Radio Shack stores. Please shed a tear for 500K 8-inch floppies.

Miguel is a level 34 Warlock guardian in Bungie's hit game Destiny. He prefers Void but Solar is loads of fun too. Ask for his player name.



Using OS Resources to Diagnose Troubles

Starting at the Ground Floor

- Your skills can be applied to numerous problem vectors.
- This presentation will concentrate on issues related to startup.
- Skills learned can be applied elsewhere.

OS X System Boot stages

- Firmware
- Booter
- Kernel
- launchd

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After power on, machine's hardware initialized, BootROM loaded from flash chips, e.g. mini-OS responsible for getting the engine running. It runs POST - tests all critical components, RAM, Video, etc. If good, STARTUP CHIME.

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BUT if there's a problem (bad RAM, no video card detected, etc.) you will hear different sounds and/or blinking power light or nothing at all. No further progress.

https://support.apple.com/en-us/HT202768

OS X System Boot stages

- Firmware
- Booter
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- launchd

Machine now hands off control to pre-determined (Startup Disk) location of the system. This is usually the internal harddrive and either Mac OS X or Bootcamp (Windows). You'll see the Apple Logo for OS X.

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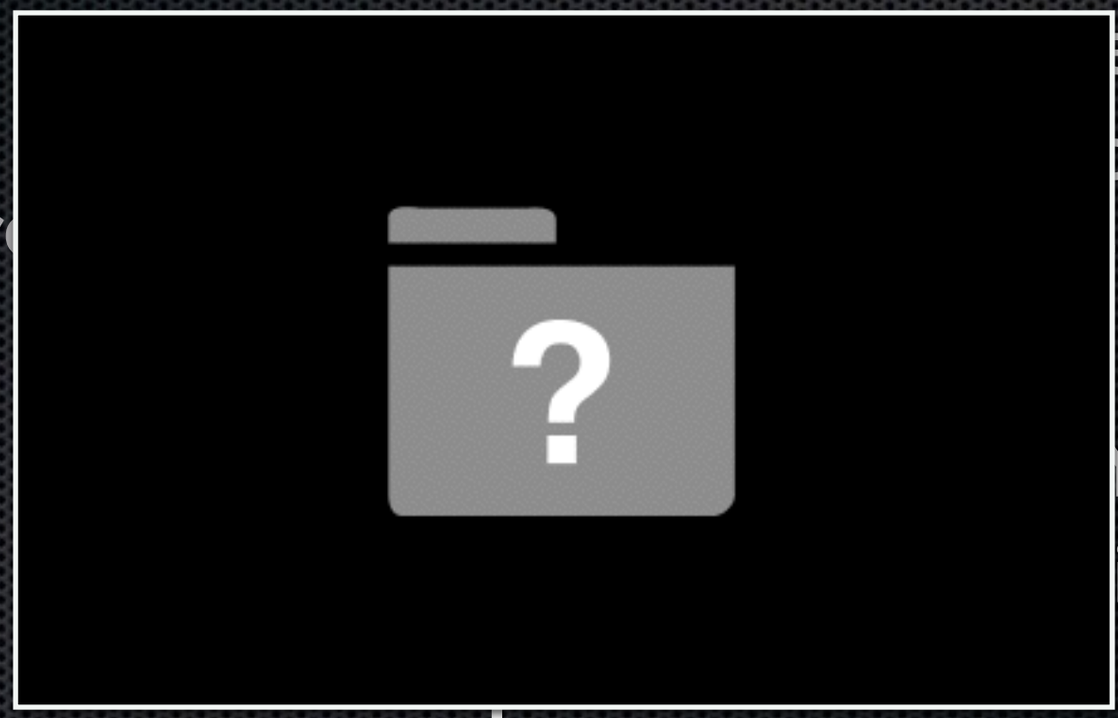
OS X System Boot stages

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BUT if the pre-determined location of the boot system is missing, damaged, etc., this will now halt the startup process. You will see the folder icon with a question mark.

OS X System Boot stages

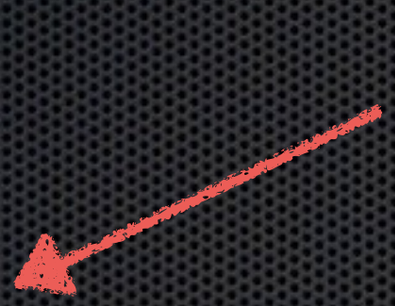
- Firmwar
- Booter
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OS X System Boot stages

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The system now starts loading in earnest. All base level functionality is being loaded and initialized, etc. This is shown with the progress bar under the Apple Logo.

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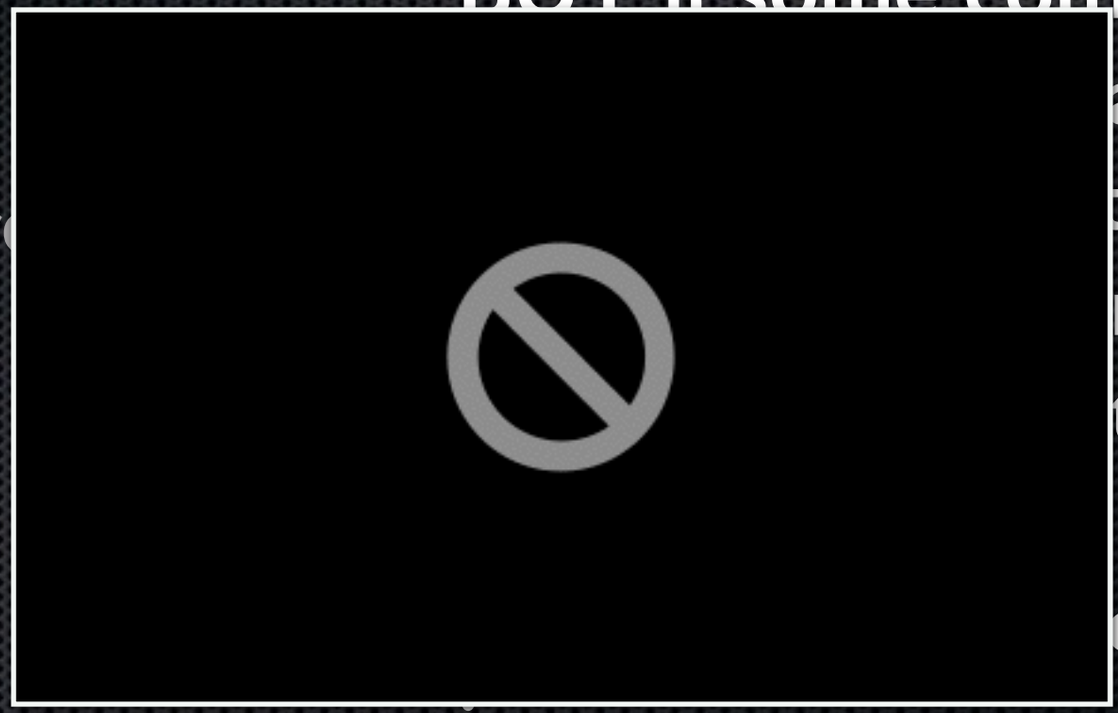
- Firmware
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BUT if some component of the system software is faulty, corrupt, etc - or by happenstance is incorrect for the machine itself, progress will again halt. You will see the grey circle/bar icon.

OS X System Boot stages

- Firmwar
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BUT if some component of are is tc - or by ncorrect tself, n halt. You circle/bar icon.

OS X System Boot stages

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We're at the home stretch. launchd now proceeds to load all other non-Kernel processes that the machine needs or has been customized to run in order to finish booting. As it finishes, you'll see your desktop or the login screen.

OS X System Boot stages

- Firmware
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BUT if there's corruption at this point, you may be stuck at a blank blue screen, or just a menubar and nothing else.

Why do I need to know all that?

- Each stage of the startup process has its own likely culprits if there's a problem.
- Being conscious of each stage gives you the power to narrow down what to look for.
- Know the beast.

KISS

KEEP IT SIMPLE STUPID

PEBKAC

PROBLEM EXISTS BETWEEN KEYBOARD AND CHAIR

please note: you're now sitting in the user's chair.

Difference between a hang and a crash

- Hang - process is ‘stuck’ or running very slowly.
  - Safari constantly beachballs.
- Crash - process has failed and exited abruptly.
  - Safari windows simply blinks out of existence.
- Could be caused by completely different issues.

Startup Key Combinations

- If the machine at minimum gives you the startup chime, you can proceed to use key presses to change the startup behavior.
- Hold Option key: Manually choose startup disk
- Hold Shift key: Safe Boot
- Hold Command-S: Single User Mode
- Hold Command-V: Verbose mode
- http://support.apple.com/en-us/HT201255
- http://support.apple.com/en-us/HT201573

launchd - mama process

- Daemons and Agents
  - (and scripts and applications)
- As defined in man page:
  - In the launchd lexicon, a "daemon" is, by definition, a system-wide service of which there is one instance for all clients. An "agent" is a service that runs on a per-user basis. Daemons should not attempt to display UI or interact directly with a user's login session. Any and all work that involves interacting with a user should be done through agents.

launchd - mama process

- Hierarchy and filepaths:
  - ~/Library/LaunchAgents Per-user agents provided by the user.
  - /Library/LaunchAgents Per-user agents provided by the administrator.
  - /Library/LaunchDaemons System-wide daemons provided by the administrator.
  - /System/Library/LaunchAgents Per-user agents provided by OS X.
  - /System/Library/LaunchDaemons System-wide daemons provided by OS X.

- What's the difference between Daemon/Agent?

launchd - mama process

- LaunchAgent
  - Screensharing. Quicklook. Speech.
- LaunchDaemon
  - coreaudio. backupd. loginwindow
- Open for your own use!

http://launchd.info

Binary method of troubleshooting

- Tried and true: Process of elimination, by cutting the workload in half.
- Use other clues to help you streamline troubleshooting process - timestamps, etc.



Likely problem?

- The OS X Daemons and Agents are rarely the problem. (If so, they may actually point to hardware)
- Look at your user/local D/A, more likely there.
- Third-party drivers for external drives, add-on extensions, system enhancements you decided you needed. Etc.
- Usually much less quantity then OS X side - easier to winnow down.

Likely problem?

```
~/Library/LaunchAgents/

drwxr-xr-x   12 miguelch  staff   408 Jul 30 12:05 .
drwx------@ 101 miguelch  staff  3434 Apr 16 02:44 ..
-rw-r--r--    1 miguelch  staff   697 Mar 26  2011 com.adobe.AAM.Updater-1.0.plist
-rw-r--r--    1 miguelch  staff   603 Sep 21  2013 com.adobe.ARM.
202f4087f2bbde52e3ac2df389f53a4f123223c9cc56a8fd83a6f7ae.plist
-rw-r--r--    1 miguelch  staff   543 Apr 14  2011 com.akamai.client.plist
-rw-r--r--    1 miguelch  staff   618 Jun  4  2014 com.apple.AddressBook.ScheduledSync.PHXCar
7051F1DA-9FF0-44FA-BE42-C3B7103F1D73.plist
-rw-r--r--    1 miguelch  staff   602 Jul 30 12:05 com.c-command.SpamSieve.LaunchAgent.plist
-rw-r--r--    1 miguelch  staff   802 Aug  9  2014 com.facebook.videochat.miguelch.plist
-rw-r--r--    1 root      staff   446 Feb  5  2015 com.lastpass.LastPassHelper.plist
-rw-r--r--    1 miguelch  staff   770 Jun 28  2014 com.valvesoftware.steamclean.plist
-rwxr-xr-x    1 miguelch  staff   424 Oct 22  2009 openlaunch.plist
-rw-r--r--    1 miguelch  staff   677 Feb 23 13:50 org.virtualbox.vboxwebsrv.plist
```

```
/Library/LaunchAgents/
-rwxr-xr-x   1 root  wheel   598 Feb 20  2014 com.efi.FSMAgent.plist
-rwxr-xr-x   1 root  wheel   501 Oct 24  2013 com.efi.FolderMapDockAgent.plist
-rw-r--r--@  1 root  admin   792 Aug  5 01:46 com.google.keystone.agent.plist
lrwxr-xr-x   1 root  admin   104 Feb 20  2014 com.oracle.java.Java-Updater.plist -> /Libr
Plug-Ins/JavaAppletPlugin.plugin/Contents/Resources/com.oracle.java.Java-Updater.plist
-rwxr-xr-x   1 root  wheel   688 Aug 11 13:29 com.teamviewer.teamviewer.plist
-rwxr-xr-x   1 root  wheel   779 Aug 11 13:29 com.teamviewer.teamviewer_desktop.plist
-rw-r--r--   1 root  wheel   721 Nov 10  2013 org.macosforge.xquartz.startx.plist
```

Likely problem?

VS

/System/Library/LaunchDaemons

/System/Library/LaunchAgents

Combined file count: ~370 files

OK, what do I do?

Easy, move suspect files OUT of their respective folder. Upon restart, they will not load. Does the problem go away?

Or from Terminal, use ‘launchctl’

```
host:~ user$ launchctl unload ~/Library/LaunchAgents/com.example.app.plist
```

Since there can be dependencies, I prefer restarting.

Be sure to note where you moved them from so you can return them there if they are not the culprit

Disk Utility on the boot volume and on the Recovery Partition

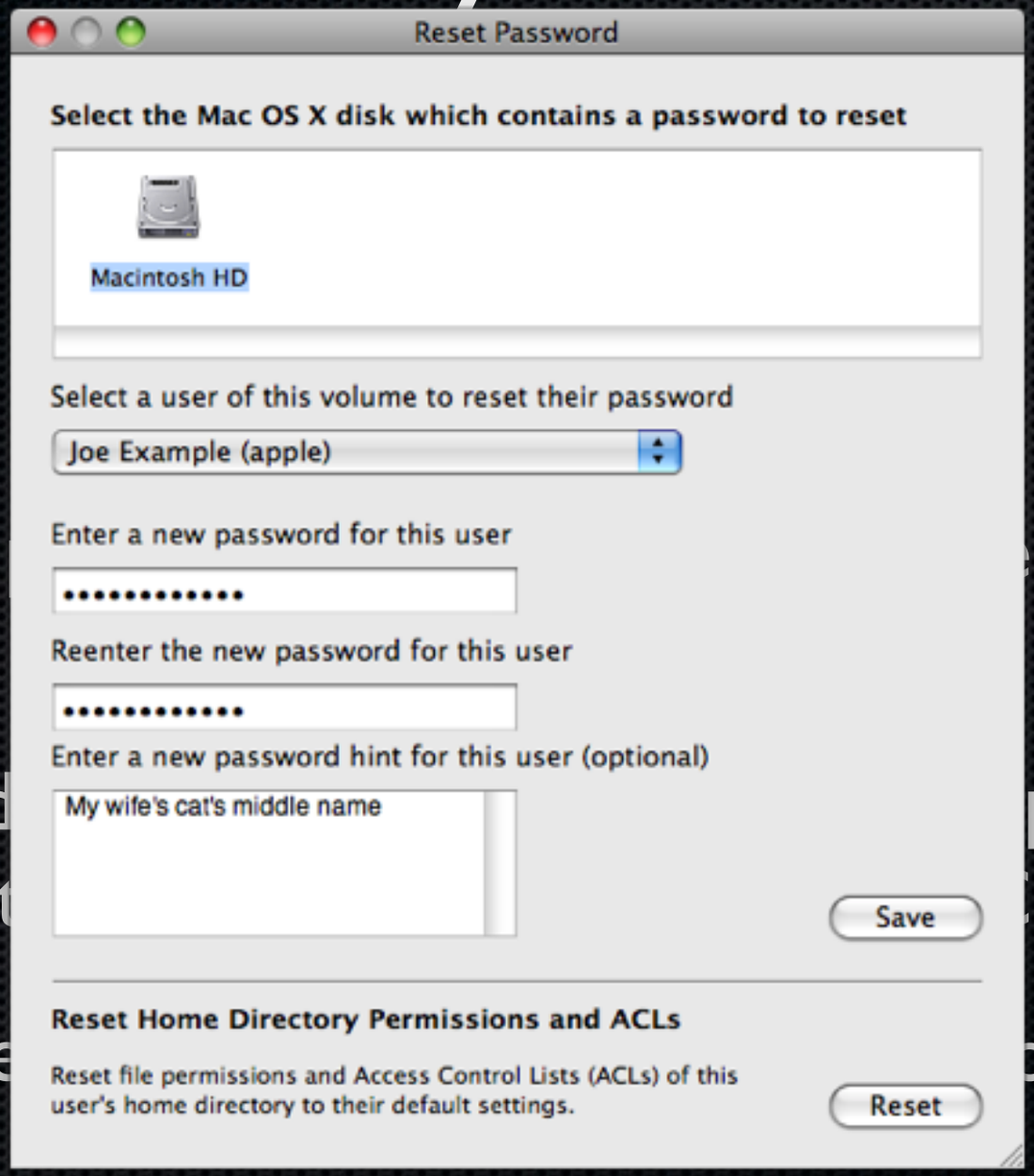
- If from startup - Press Command-R to enter Recovery Partition.
- In either case, launch Disk Utility, select the boot drive, and click on REPAIR PERMISSIONS or REPAIR DISK.
- Will take several minutes. Usually benign errors appear. Be on the lookout for RED errors.
- If drive is suspect, be careful doing this.
- Permissions can sometimes be a placebo.

Recovery Partition

- What do you do if one doesn't exist?
- Having a portable recovery partition (e.g., USB drive)
- http://diskmakerx.com
- Password reset utility to reset a user's password and also reset home folder permissions/ACLs:
- Launch Terminal, then type 'resetpassword'

Recovery Partition

- What do
- Having a .g., USB drive)
- Password password and also reset Ls:
- Launch Te ord’



Utilities moved from the Utilities Folder

- Many common tools are auto-launched by the system when it detects problems, but you can manually launch them when needed.
  - /System/Library/CoreServices/Applications/
  - /System/Library/CoreServices/
  - Be careful, not everything here is meant for tinkering!

Utilities moved from the Utilities Folder

- Directory Utility
- Wireless Diagnostics
- Network Utility

Activity Monitor

- ‘top’ is the terminal equivalent.
  - top -o cpu or time or mem
- Use to locate problem processes.
- Hangs, not crashes.

System Console

- Most overlooked tool in my opinion.
- Is set to constantly spew information on what it is doing - why isn't it referred to *first*?
- Can be tricky to navigate
- But can quickly find issues.

Be Specific

- Be specific, if you're not sure how the problem app manifests itself in the console - remember, the console is an *active* process. Fiddle with the program, and you can see what it triggers on the console.
- Couple this with good Google-fu, and you can find what's expected and what's unusual.

Command Line Tools to know how to use

- ipfw
- ipconfig
- ifconfig
- networksetup
- airport
- tcpdump
- lsof
- top
- nettop
- nslookup
- dig

More Resources

- Google always
- Apple Consultants Network
- afp548.com
- support.apple.com
- Peachpit books
- macadminmonthly.org
- macintouch.com
- tidbits.com

Questions?



Miguel Chavez
miguel@c3factory.com

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