

Andrew Urbaczewski

University of Denver



Dr. Andrew Urbaczewski is an Associate Professor and Chair of the Business Information and Analytics Department (and unofficial Mac support) in the Daniels College of Business at the University of Denver.

This is Andrew's second time speaking at MacTech Pro. He continues to be astounded and amazed at all the smart people he meets at MTPro and MacTech Conference.

Andrew first learned coding on an Apple IIe in 1981, and can be found daydreaming about it while on the golf courses and ski mountains of Colorado.



Using OS Resources to Diagnose Troubles

How Neil Gets me to Present



Topics

- Startup Process and Tools
- GUI Tools
- Command Line Tools
- Troubleshooting Techniques
- Resources



Startup Process and Tools

Boot Failure Examples



Could not load boot.efi



Looking for booter/kernel on netboot server



No bootable device found

OS X System Boot stages

Firmware



Booter



Kernel



launchd

OS X System Boot stages

Firmware



Booter



Kernel



launched

What's going on: System hardware test and initialized, booter is located and started.

Success: Chime and LCD backlight on. Screen is black (maybe).

Failure: Series of beeps to indicate what is failing.

More info:

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

OS X System Boot stages

Firmware



Booter

What's going on: Loads the system kernel and hardware drivers



Kernel

Success: Apple logo on black/gray screen

Failure: Folder with question mark



launchd

FileVault login occurs after the booter

OS X System Boot stages

Firmware



Booter



Kernel



launched

What's going on: Provides system's foundation and loads additional drivers and the core BSD UNIX system.

Success: Progress bar or spinning wheel below the Apple.

Failure: Prohibitory Symbol



OS X System Boot stages

Firmware



Booter

What's going on: First non-kernel process responsible for loading the OS



Kernel

Success: Login screen appears, or Finder if auto-login



launchd

Failure: No login window or user environment

launchd

- Parent of everything: One process to rule them all
- Resources a file at different levels
 - System
 - Library
 - User
- Launch Agents vs Launch Daemons
- Things you can do: Create your own

More Info: https://developer.apple.com/library/mac/documentation/MacOSX/Conceptual/BPSystemStartup/Chapters/CreatingLaunchdJobs.html#//apple_ref/doc/uid/10000172i-SW7-

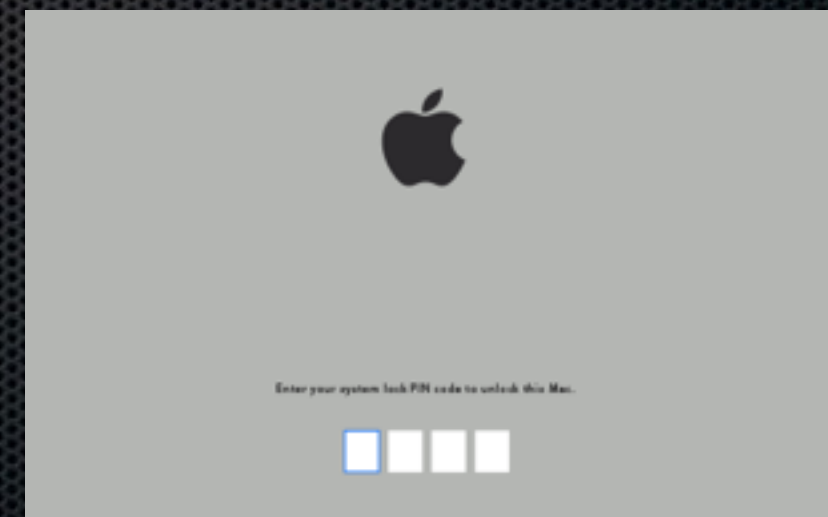
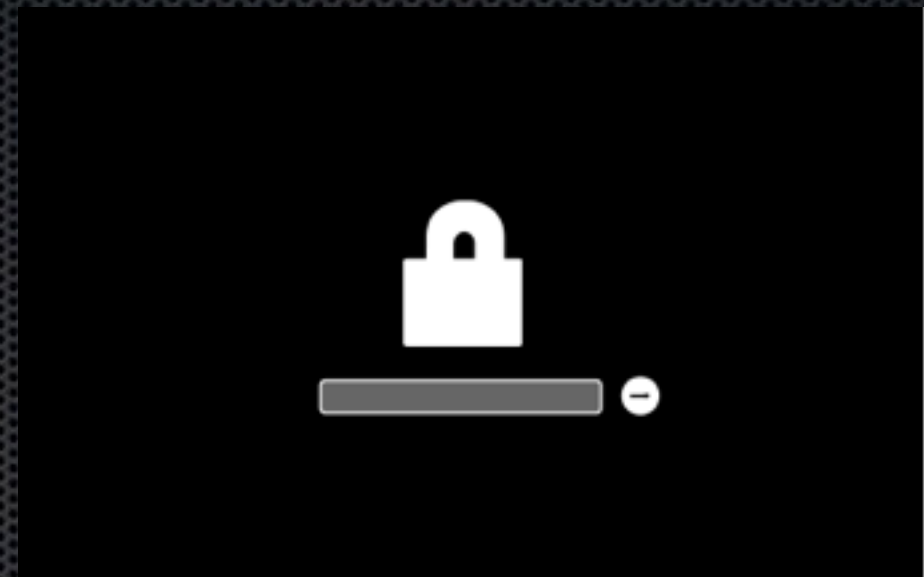
Startup Shortcuts: Startup Manager

- Hold down option at chime
- Select Boot Volume
- More info:
<https://support.apple.com/kb/HT204417>

Firmware Passwords

- Firmware Password
- Find My Mac: Firmware based password

<https://support.apple.com/en-us/HT204455>



Startup Shortcuts: Single User and Verbose Mode

- Single User
- Command-S
- Good for troubleshooting OS at minimum level
- Verbose Mode
- Command-V
- Good for troubleshooting startup

More info:

<https://support.apple.com/en-us/HT201573>

Startup Shortcuts: Safe Mode

- Hold down shift.
- Verifies your startup disk, and attempts to repair directory issues if needed
- Loads only required kernel extensions
- Prevents Startup Items and Login Items from opening automatically
- Disables user-installed fonts
- Deletes font caches, Kernel cache and other system cache files

More Info: <https://support.apple.com/en-us/HT201262>

Startup Shortcuts

- Hold down 'C'
 - Start up from USB, or optical disc
- Eject (⏏), F12, mouse button, or trackpad button
 - Eject removable media
- Command-R
 - Start up from OS X Recovery
- Option-Command-R
 - Start up from OS X Internet Recovery

More info:

<https://support.apple.com/en-us/HT201255>

Recovery Partition

APPLE SSD SM1024G:

Capacity: 1 TB (1,000,555,581,440 bytes)
Model: APPLE SSD SM1024G
Revision: BXW1SA0Q
Serial Number: S299NYAG423870
Native Command Queuing: Yes
Queue Depth: 32
Removable Media: No
Detachable Drive: No
BSD Name: disk0
Medium Type: Solid State
TRIM Support: Yes
Partition Map Type: GPT (GUID Partition Table)
S.M.A.R.T. status: Verified

Volumes:

EFI:

Capacity: 209.7 MB (209,715,200 bytes)
BSD Name: disk0s1
Content: EFI
Volume UUID: 0E239BC6-F960-3107-89CF-1C97F78BB46B

disk0s2:

Capacity: 999.7 GB (999,695,822,848 bytes)
BSD Name: disk0s2
Content: Apple_CoreStorage

Recovery HD:

Capacity: 650 MB (650,002,432 bytes)
BSD Name: disk0s3
Content: Apple_Boot
Volume UUID: 8A4C8C0F-2AB5-3FC0-942B-336C4C74BBEE

Recovery Partition

- Startup: Command-R
- Many useful tools:
 - Reinstall or Restore from Time Machine backup
 - Password reset utility
 - Network utility
 - Disk utility
 - Safari
- Recovery partition missing?
- Having a portable recovery partition

More Info: <https://support.apple.com/en-us/HT4718>

Startup Shortcuts

- Command-T
 - Target disk mode
(What about Filevault)



Filevault 2

- Full Volume Encryption, not full Disk Encryption
- Requires local Recovery Partition
- Subsequent Volumes not Encrypted, but can be

Filevault 2

- Offered at setup IF signed in with iCloud
- Can be skipped and setup later
- Setup in /System Preferences/Security & Privacy
- Logged in user enabled by default

Filevault 2

- In OS X Yosemite, you can store your FileVault key in iCloud. You can then use your iCloud account name and password to unlock your startup drive or reset your password.
- In OS X Mavericks, you can share your FileVault key with Apple by answering a set of security questions. You can then contact Apple Support if you forget your login password and need to decrypt your startup drive.

Filevault 2

Reset Password

If you can't log into your computer because you forgot your password, you can reset it now.



Choose the problem you are having when logging in:

- ☒ I forgot my password
- ☐ My password doesn't work when logging in
- ☐ My keyboard isn't working when typing my password to log in



Previous



Next

Shutdown Shortcut

Command Control Power



CMD-CTRL-PWR

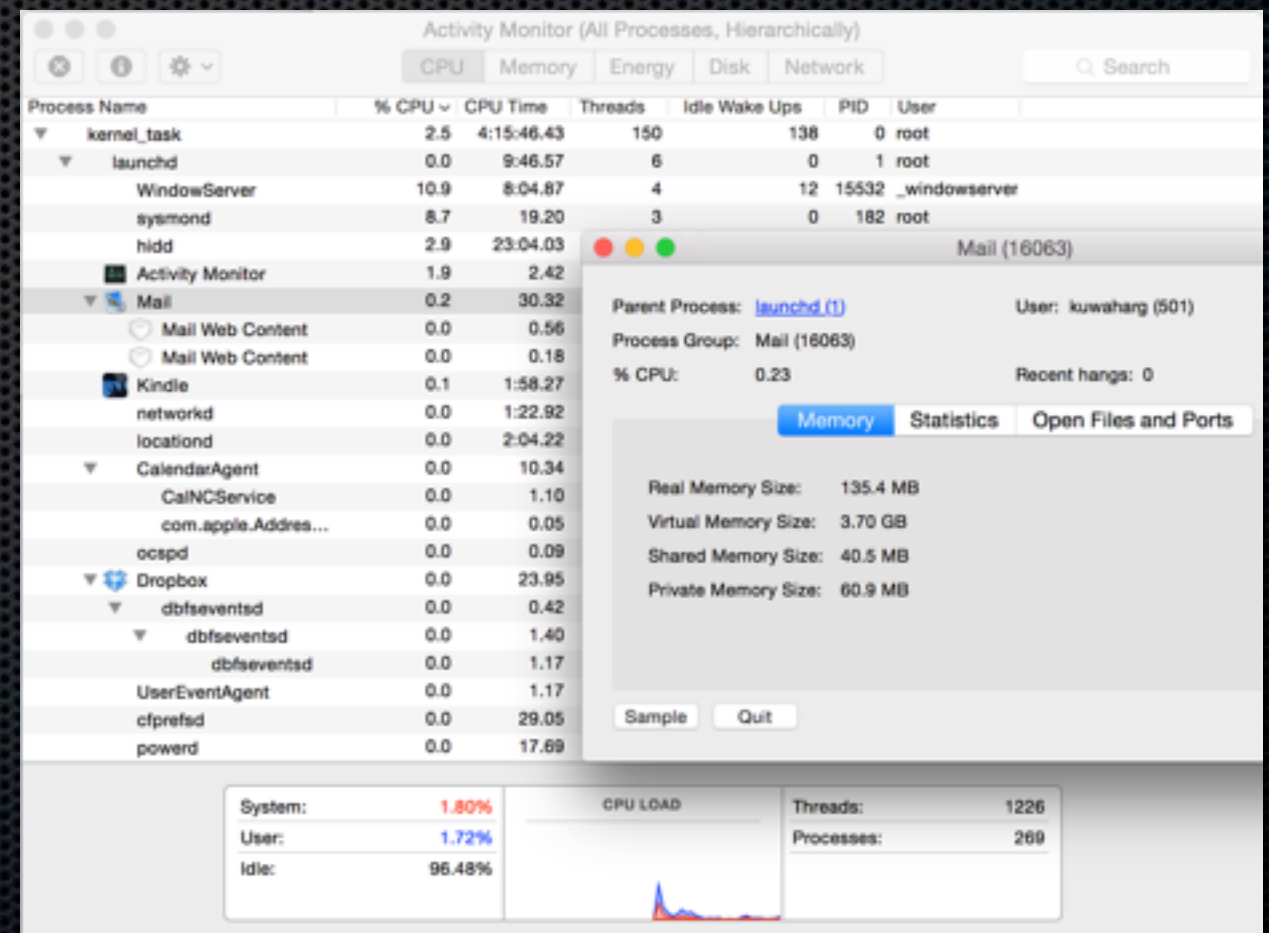
GUI Tools

GUI Tools: Disk Utility

- Found in Utilities folder and Recovery Partition
- Repairing a disk
- Repairing permission
- Special concerns: `/var/db/receipts`

GUI Tools: Activity Monitor

- Troubleshooting Server & Client specific concerns.
- top - on command-line
- Finding the “pigs”
 - CPU
 - Memory
 - Energy
 - Disk
 - Network



GUI Tools: System Console

- Log reader for OS X
- Log locations:
 - /var/log
 - /Library/Logs
 - /System/Library/Logs
 - ~/Library/Logs
- *Back that thing up. Time Machine won't

GUI Tools: System Information

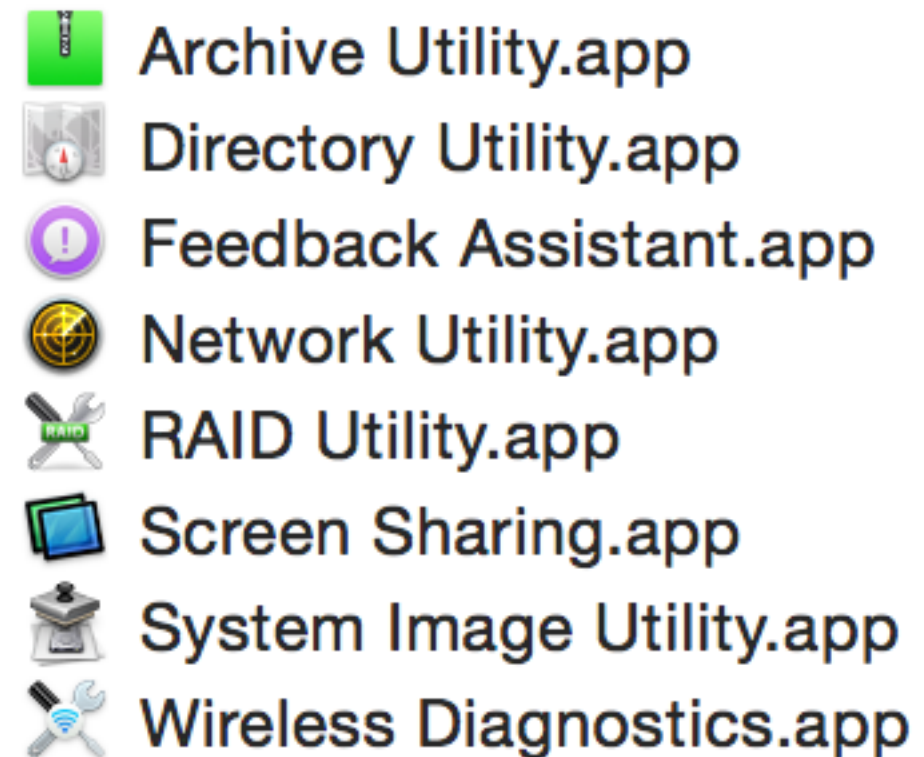
- Summary of information about the system
 - Hardware
 - Software
 - Network
 - Ports and connections

More Info:

<https://support.apple.com/en-us/HT203001>

GUI Tools moved from Utilities

- Apple moved useful tools to CoreServices
 - /System/Library/CoreServices/Applications
- Directory Utility
- Wireless Diagnostics
- Network Utility
- Be careful in there!



Command Line Tools

Command Line: Help

- man
- apropos
- whatis

Command Line Tools: Config

- scutil
- networksetup
- systemsetup
- dscl and dseditgroup

Command Line Tools: Filesystem

- lsof
- iostat
- less / more / tail
- grep

Command Line: Network

- ipconfig
- ifconfig
- networksetup
- airport
- ipfw
- tcpdump
- dig
- nslookup

Command Line: Process & CPU

- top
- ps

Troubleshooting Techniques

Hang vs Crash

Application hang

- Stop functioning
- User pushes the button
- Troubleshooting:
 - Wait it out
 - Look at logs
 - Force quit

Application crash

- Unexpected quit
- Troubleshooting:
 - Look at logs
 - Temporary remove preference files

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>

Be Specific

- Be specific, troubleshoot an authentication problem or a network problem using the appropriate logs
- Describe exactly what happens in as much specific detail as possible
- Google is your friend
 - use site:apple.com
 - limit searches by date

More Resources

- MacAdmin Links:
 - <http://krypted.com/guides/macadmin-links/>
- Chat with fellow MacAdmins
 - Slack - macadmins.org
 - IRC - ##osx-server freenode channel?
- Apple Support Pages
- Developer Documentation

Questions?



Andrew Urbaczewski
@ProfUrbaczewski
andrew.urbaczewski@du.edu