

Gretchen Kuwahara

Gretchen Kuwahara has over 15 years experience deploying and maintaining almost anything Apple in a higher education environment. At Oregon State University she deployed and maintained over a thousand Macs and many iPads for student use, as well as being sysadmin for numerous Mac and Linux servers. Currently, as a System Administrator at Penn State University, she is working on various projects including Mobile Device Management; Xsan; and Mac and Linux server administration.

When she's not playing with technology she enjoys traveling, family time, cheering on her alma mater's basketball teams, and exploring her new home.



Using OS Resources to Diagnose Troubles

Topics

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

Startup Process and Tools

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.

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



launchd

Failure: Folder with question mark



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; Handles loading other software
- 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 Mngr

- Hold down option at chime
- Temporarily change boot disk
- More info:
<https://support.apple.com/kb/HT204417>

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 spacebar
- Loads only essential drivers
- Does not launch startup items, fonts
- Deletes kernel, fonts and other caches
- Slower boot...

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

Startup Shortcuts

- Hold down 'C'
 - Start up from USB, CD, or DVD
- Eject (⏏), F12, mouse button, or trackpad button
 - Eject removable media
- Command-R
 - Start up from OS X Recovery
- Command-T
 - Target disk mode

More info:

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

Recovery Partition

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

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

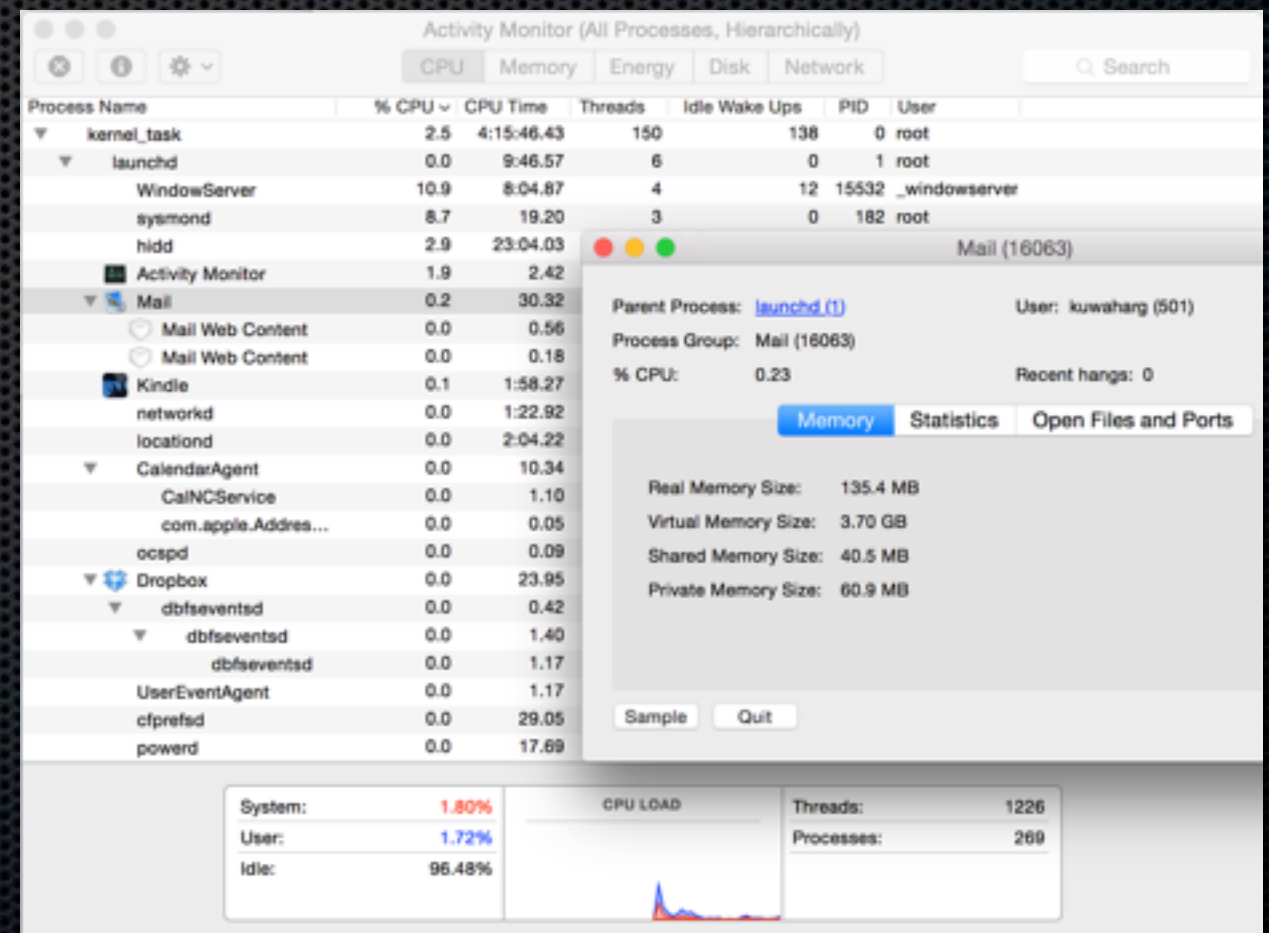
GUI Tools

GUI Tools: Disk Utility

- Found in Utilities folder and Recovery Partition
- Repairing a disk
- Repairing permission
- Special concerns

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

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 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

Command Line: Help

- man
- apropos
- whatis

Troubleshooting Techniques

Binary method of troubleshooting

- Divide and conquer.
- Group items to reduce scope
- Roots back to Mac OS 9 and extension conflicts

Hang vs Crash

Application hang

- Stop functioning
- Spinning color wheel
- Troubleshooting:
 - Wait it out
 - Look at logs
 - Force quit

Application crash

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

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?



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