

Deployment

Decisions, Decisions, Decisions
Weathering the options



Leon H. Lincoln III
System Administrator

Agenda

- Planning
- Deployment Solutions (for any \$budget)
- Packaging
- Tools We Use
- Resources
- Q & A

Before we begin...

- Learn from others
- Reducing complexity and re-using resources increases reliability and overall user satisfaction
- Total effort doesn't change no matter how many endpoints you maintain
- There's no “one fits all” solution

Planning

- Gather security and user requirements, get sign-off if possible
- Think years ahead before looking to solution
- Know your budget and resources, set realistic expectations
- Take the time to do it “mostly” right the first time

Image Deployment

- “Manual” Non-Imaging - This is where we all began
- Monolithic “Golden Master Mac”
- Thin Imaging
- Modular Imaging

“Manual” Non-Imaging

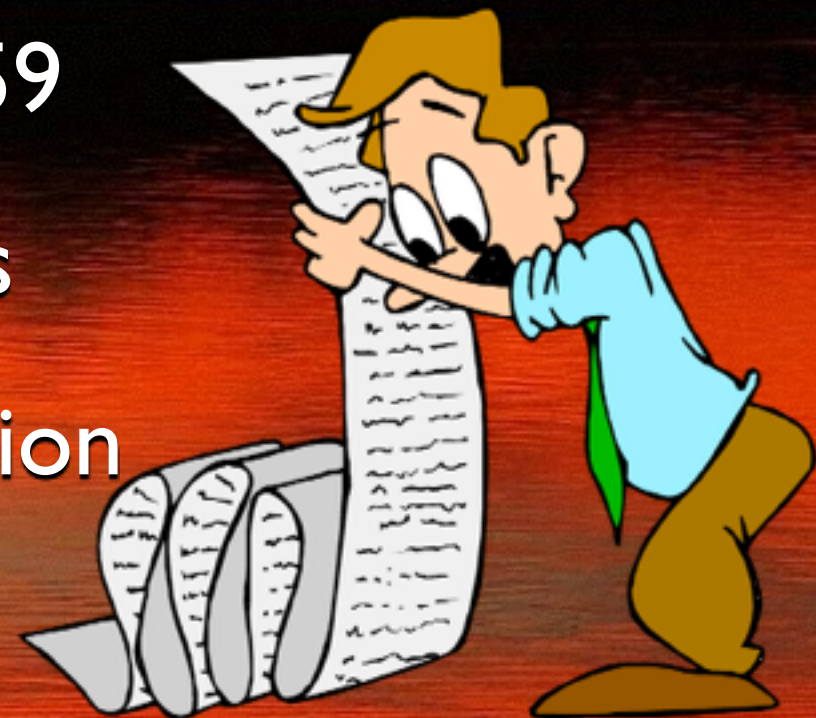
- Ergonomic nightmare
- No Mac will ever be the same. Guaranteed.
- Inefficient use of resources
- Slow to deploy

I really hate myself.



Monolithic “Golden Master Mac”

- Make one and clone to all!
- How we all used to do it
- A LOT of work ALL the time (if you want support)
- Support limited to build version of core OS
<http://support.apple.com/kb/HT1159>
- Inconsistency across image releases
- Requires additional post-configuration



Thin Imaging

- Out-of-the-Box approach
- Reduced time to deploy
- System-specific image need not apply
- Internet restore compatible
- Potential network bandwidth impact
- Human-factor risk
- BYOD “capable”



Modular Imaging

- “Gotta keep ‘em separated” (OS / Recovery Partition / Applications / Settings)
- Fast to deploy updated image for new Apple hardware
- 3rd Party applications and patches stay current
- Consistent experience across images
- BYOD “capable” as well



No-image deployment

- Benefit: Fastest method of deployment
- Benefit: Doesn't require system-specific images
- Benefit: Ability to use Internet-restore.

Mac Third Party Solutions:

Who they are, what are their strengths

- JAMF Casper and Composer (Mac OS, iOS)
- Absolute (Mac, Windows, iOS, Android)
- FileWave (Mac, Windows, iOS, Android, Linux)
- Munki (Mac OS)
- Puppet (Mac OS, Windows, Linux, VMWare)
- Apple Remote Desktop (Mac OS)

Additional Options

- Centrify: From a Directory Point of view
- DeployStudio
- LANDesk - Windows focus
- InstaDMG or AutoDMG
- CanHazImage
- AutoPkg

Thin/Layered Imaging

- Use existing, good OS & Recovery HD
- Build packages for everything
- Build scripts for configuration
- Using tools like Casper Suite, Munki, etc.
 - Useful for BYOD environments
 - Supported 10.7/10.8/10.9 within a day

DeployStudio



DeployStudio

- Leverages NetBoot/NetInstall
- Free - deploystudio.com
- Requires OS X Server
 - AFP, NetInstall, optionally DHCP, DNS, Directory Services

DeployStudio

- DeployStudio Assistant
 - Setup, create NetBoot images
- DeployStudio Admin
 - Manage configs/workflows
- DeployStudio Runtime
 - installed on your NetBoot image, runs workflows

Sample Workflow

The screenshot shows the DeployStudio Admin application window. The title bar reads 'DeployStudio Admin' with menu items 'Server', 'Edit', 'Window', and 'Help'. Below the title bar, it says 'DeployStudio Admin connected to mainserver.pretendco.com'. The interface is divided into several sections:

- Left Sidebar:** Contains navigation icons for 'Runtime', 'Control', and 'Logs'. Below these are expandable sections: 'ACTIVITY', 'COMPUTERS' (with a 'Lab' sub-item), 'WORKFLOWS' (highlighted with a blue bar and a '5' badge), 'MASTERS', 'PACKAGES', and 'SCRIPTS' (with a '5' badge).
- Central Table:** A table listing workflows with columns: 'Title', 'Description', 'Access group', and 'Identifier'.

Title	Description	Access group	Identifier
Create a master from a volume	This simple workflow enables you...	-	04062220-1111-8888-2222-000000000000
Create Master Images		-	C881578C-D528-4622-8138-87011205F82E
Install a package (.pkg)	This simple workflow enables you...	-	04062220-1111-8888-2222-000000000020
Restore a master on a volume	This simple workflow enables you...	-	04062220-1111-8888-2222-000000000010
Triple-OS restoration	This workflow shows the 4 tasks...	-	04062220-1111-8888-2222-000000000030
- Workflow Configuration Panel:** Below the table, there's a 'Disk image' icon with a red 'x' and a plus sign. Below that are fields for 'Source:', 'Type:' (set to 'Compressed - faster restoration, small footprint'), 'Format:' (set to 'Auto-detect'), and 'Keywords:'. At the bottom, there are several checkboxes:
 - ☒ Try to create intermediate files on a local volume to preserve network bandwidth
 - ☒ Cleanup Mac OS X machine dependent files and caches
 - ☒ Image NTFS volumes with OS X built-in tools to allow multicast deployment
 - ☐ Try to shrink NTFS volume's size before imaging
 - ☐ Automate
- Right Panel:** A grid of workflow icons with descriptions, including 'Active Directory binding', 'Alert', 'Automatic enrollment', 'Configure', 'Disk image', 'File copy', 'Firmware Security', 'Generic', 'Hostname form', 'Licenses form', 'Localization', 'Network location form', 'New user form', 'Open Directory binding', 'Package install', 'Partition', 'Periodic NetBoot', 'Restore', 'Shut down', 'Software update', and 'Workflow'.

Four sample workflows are included

- Create a master from a volume
- Install a package (.pkg)
- Restore a master on a volume
- Triple-OS restoration

Sample Workflow

The screenshot shows the DeployStudio Admin application window. The title bar reads 'DeployStudio Admin' with menu items 'Server', 'Edit', 'Window', and 'Help'. Below the title bar, it says 'DeployStudio Admin connected to mainserver.pretendco.com'. The interface is divided into several sections:

- Left Sidebar:** Contains navigation icons for 'Runtime', 'Control', and 'Logs'. Below these are expandable sections: 'ACTIVITY', 'COMPUTERS' (with a sub-item 'Lab'), 'WORKFLOWS' (highlighted with a blue bar and a '5' icon), 'MASTERS', 'PACKAGES', and 'SCRIPTS' (with a '5' icon).
- Table:** A table with columns 'Title', 'Description', 'Access group', and 'Identifier'. It lists several workflows, including 'Create a master from a volume', 'Create Master Images', 'Install a package (pkg)', 'Restore a master on a volume', and 'Triple-OS restoration'.
- Workflow Configuration Panel:** Located below the table, it shows settings for the selected workflow 'Create a master from a volume'. It includes a 'Disk Image' icon, a 'Source' dropdown, a 'Type' dropdown set to 'Compressed - faster restoration, small footprint', a 'Format' dropdown set to 'Auto-detect', and a 'Keywords' text field.
- Checkboxes:** A group of checkboxes at the bottom of the configuration panel, including 'Try to create intermediate files on a local volume to preserve network bandwidth', 'Cleanup Mac OS X machine dependent files and caches', 'Image NTFS volumes with OS X built-in tools to allow multicast deployment', 'Try to shrink NTFS volume's size before imaging', and 'Automate'.
- Right Panel:** A grid of workflow icons with descriptions, such as 'Active Directory binding', 'Automatic enrollment', 'Alert', 'Configure', 'Disk image', 'File copy', 'Firmware Security', 'Generic', 'Hostname form', 'Licenses form', 'Localization', 'Network location form', 'New user form', 'Open Directory binding', 'Package install', 'Partition', 'Periodic NetBoot', 'Restore', 'Shut down', and 'Software update'.
- Bottom Bar:** Contains buttons for '+', '-', and a trash icon, followed by 'Revert' and 'Save' buttons.

A yellow callout box with a bullet point is overlaid on the bottom right of the interface, containing the text: **Create a master from a volume**.

Sample Workflow

The screenshot shows the DeployStudio Admin application window. The title bar reads 'DeployStudio Admin' with menu items 'Server', 'Edit', 'Window', and 'Help'. The status bar indicates 'DeployStudio Admin connected to mainserver.pretendco.com'. The left sidebar contains a tree view with categories: 'ACTIVITY', 'COMPUTERS' (with a sub-item 'Lab'), 'WORKFLOWS' (highlighted with a '5' badge), 'MASTERS', 'PACKAGES', and 'SCRIPTS' (with a '5' badge). The main pane displays a table of workflows:

Title	Description	Access group	Identifier
Create a master from a volume	This simple workflow enables you...	-	04062220-1111-8888-2222-000000000000
Create Master Images			C883578C-D52B-4622-B13B-87011205F82E
Install a package (.pkg)	This simple workflow enables you...	-	04062220-1111-8888-2222-000000000020
Restore a master on a volume	This simple workflow enables you...	-	04062220-1111-8888-2222-000000000010
Triple-OS restoration	This workflow shows the 4 tasks...	-	04062220-1111-8888-2222-000000000030

Below the table is a 'Partition' section with a visual disk layout. The 'Target volume' is set to 'First disk available'. The layout shows three partitions: 'LINUX 10GB', 'MacOSX 80%', and 'WINDOWS 20%'. The 'Apply layout template' is set to 'Custom'. There are checkboxes for 'Secure erase before partitioning with the algorithm' (set to 'single-pass zero-fill (~4 hours for 500GB)') and 'Automate'. A 'Revert' button and a 'Save' button are at the bottom right of the main pane.

On the right side of the interface is a 'Task Library' with various icons and descriptions:

- Active Directory binding: Binds a computer to an Active Directory server.
- Alert: Pauses the workflow by displaying an alert message.
- Automatic enrollment: Enrolls a computer to a MDM server at first boot.
- Configure: Applies computer's settings defined in the DeployStudio database.
- Disk image: Creates a disk image of a volume or partition.
- File copy: Copies files and folders to a volume.
- Firmware Security: Enables Firmware Security at boot.
- Generic: Runs a script or any executable file.
- Hostname form: Updates computer's name in the DeployStudio database.
- Licenses form: Updates computer's Server & Xsan licenses in the DeployStudio database.
- Localization: Configures the default system language & keyboard layout.
- Network location form: Updates computer's network locations in the DeployStudio database.
- New user form: Updates computer's local users list in the DeployStudio database.
- Open Directory binding: Binds a computer to an Open Directory server.
- Package install: Installs a package to a volume.
- Partition: Creates multiple partitions on a specific disk.
- Periodic NetBoot: Configures the computer to NetBoot periodically.
- Restore: Restores a disk image to a specific partition or disk.
- Shut down: Shuts down the computer at the end of the workflow (NetBoot only).
- Software update: Customizes the Software update client.
- Time: Configures the default network time server & time zone.
- Workflow: Inserts all the tasks of another workflow at runtime.

A yellow callout box with a bullet point is overlaid on the bottom right of the screenshot, containing the text: '• Install a package (.pkg)'.

Sample Workflow

The screenshot displays the DeployStudio Admin application window, connected to mainserver.pretendco.com. The interface is divided into several sections:

- Left Sidebar:** Contains navigation icons for Runtime, Control, and Logs, and a tree view with categories: ACTIVITY, COMPUTERS (Lab), WORKFLOWS (5), MASTERS, PACKAGES, and SCRIPTS (5).
- Table:** A list of workflows with columns: Title, Description, Access group, and Identifier. The workflow "Restore a master on a volume" is selected.
- Workflow Configuration:** Below the table, there are fields for "Target volume" (set to "MacOSX") and "Image" (set to "HFS" and "macosx.hfs.dmg"). A "Restore" button is visible.
- HFS only options:** A section with various checkboxes and sliders for configuring the restoration process, including "Don't check restoration (faster)", "Erase target for block copy restoration (faster)", "Rename ByHost prefs", "Cleanup machine dependent files and caches", "Restore system recovery partitions", "Enable multicast restoration", "Pause workflow until multicast ends", "Stream data rate" (100 MBs), "Startup trigger" (0), "Client disk speed" (125 MBs), "Timeout" (0), "Add generic BCD (Vista and later)", "Expand restored NTFS volume", "Set as default startup volume", and "Automate".
- Right Panel:** A grid of icons representing different tasks available for the workflow, such as "Active Directory binding", "Automatic enrollment", "Disk image", "Firmware Security", "Hostname form", "Localization", "New user form", "Package install", "Periodic NetBoot", "Shut down", "Time", "Alert", "Configure", "File copy", "Generic", "Licenses form", "Network location form", "Open Directory binding", "Partition", "Restore", "Software update", and "Workflow".

A yellow callout box with the text "Restore a master from a volume" is overlaid on the bottom right of the interface.

Sample Workflow

The screenshot displays the DeployStudio Admin application window, titled 'DeployStudio Admin connected to mainserver.pretendco.com'. The interface includes a menu bar (DeployStudio Admin, Server, Edit, Window, Help) and a toolbar with 'Runtime', 'Control', and 'Logs' buttons. A left sidebar contains a tree view with categories: ACTIVITY, COMPUTERS (Lab), WORKFLOWS (5), MASTERS, PACKAGES, and SCRIPTS (5). The main pane shows a table of workflows:

Title	Description	Access group	Identifier
Create a master from a volume	This simple workflow enables you...	-	04062220-1111-8888-2222-000000000000
Create Master Images		-	C883578C-D52B-4622-813B-87011205F82E
Install a package (pkg)	This simple workflow enables you...	-	04062220-1111-8888-2222-000000000020
Restore a master on a volume	This simple workflow enables you...	-	04062220-1111-8888-2222-000000000010
Triple-OS restoration	This workflow shows the 4 tasks...	-	04062220-1111-8888-2222-000000000030

Below the table is a 'Restore' button with a red arrow icon. The configuration section for the selected workflow includes:

- Target volume: Enter value... (dropdown menu) WINDOWS
- Image: NTFS (dropdown menu) windows.ntfs.gz
- HFS only options:
 - Rename volume to: (text field)
 - ☒ Don't check restoration (faster)
 - ☒ Rename ByHost prefs
 - ☒ Restore system recovery partitions
 - ☐ Enable multicast restoration
 - Stream data rate: 100 MBs
 - Client disk speed: 125 MBs
 - ☐ Add generic BCD (Vista and later)
 - ☒ Set as default startup volume
 - ☐ Automate
 - ☒ Erase target for block copy restoration (faster)
 - ☒ Cleanup machine dependent files and caches
 - ☐ Pause workflow until multicast ends
 - ☐ Expand restored NTFS volume

On the right, a 'Workflow' panel lists various tasks with icons and descriptions, such as 'Active Directory binding', 'Automatic enrollment', 'Disk image', 'Firmware Security', 'Hostname form', 'Localization', 'New user form', 'Package install', 'Periodic NetBoot', 'Shut down', 'Time', 'Alert', 'Configure', 'File copy', 'Generic', 'Licenses form', 'Network location form', 'Open Directory binding', 'Partition', 'Restore', 'Software update', and 'Workflow'. A 'Revert' and 'Save' button are at the bottom right.

• Triple OS Restoration (Windows)

Sample Workflow

The screenshot displays the DeployStudio Admin application window, connected to mainserver.pretendco.com. The interface is divided into several sections:

- Left Sidebar:** Contains navigation icons for Runtime, Control, and Logs, and a tree view with categories: ACTIVITY, COMPUTERS (Lab), WORKFLOWS (5 items), MASTERS, PACKAGES, and SCRIPTS (5 items).
- Workflow List:** A table showing available workflows. The 'Triple-OS restoration' workflow is selected.
- Workflow Details:** A section for configuring the selected workflow, including a 'Restore' button with a red arrow icon.
- Configuration Fields:**
 - Target volume: Enter value... (dropdown menu set to LINUX)
 - Image: DEV (dropdown menu set to linux.dd.gz)
 - HFS only options: A group of checkboxes for advanced restoration settings.
- Right Panel:** A grid of workflow icons with descriptions, including: Active Directory binding, Alert, Automatic enrollment, Configure, Disk image, File copy, Firmware Security, Generic, Hostname form, Licenses form, Localization, Network location form, New user form, Open Directory binding, Package install, Partition, Periodic NetBoot, Restore, Shut down, Software update, Time, and Workflow.

Triple OS Restoration (Linux)

Prepare The Image

- Install all updates
- Create users (admin account for remote management)
- Install desired applications (with serial #'s)
- Run Disk Utility



- Unbind from test environment
- DeployStudio includes Workflow Tasks for rebinding the systems to both Active Directory and/or Open Directory
- Select name of Deployment Image

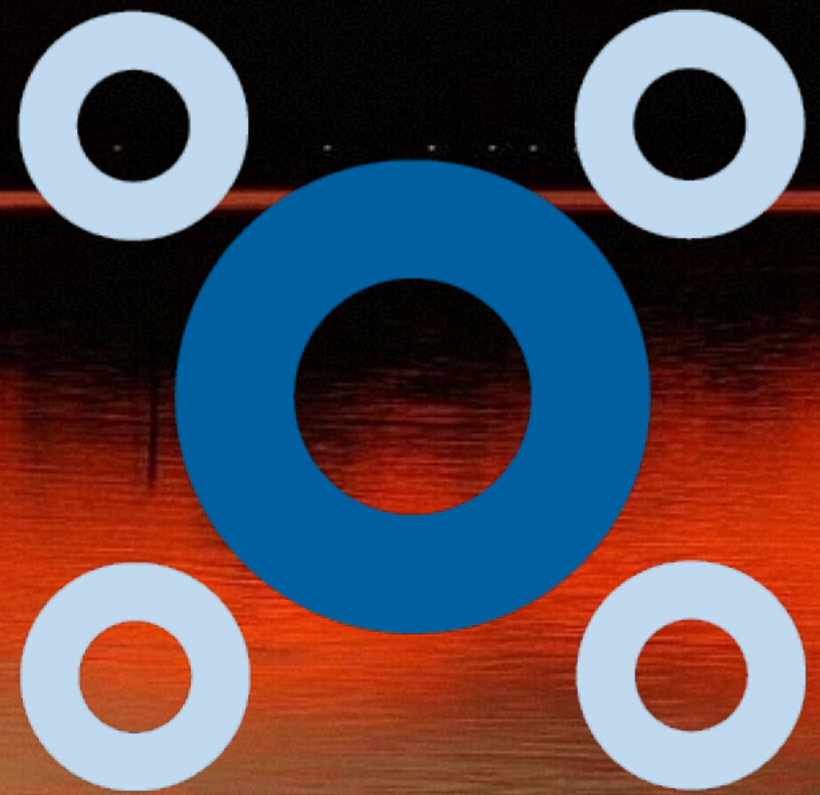
CASPER



JAMF
software

Casper Deployment

- Modular approach
- Packages are king
- Casper Tools
 - Casper Admin
 - Casper Imaging
 - Composer



Casper Admin

Casper Admin 9.31

New Config New Category Add Printers Add Dock Items New Adobe Install Info Delete

Filter

REPOSITORY
All Items

CONFIGURATIONS
10.9 Base
10.9 Recovery HD
Broad 5.0
B5-iMac (10.9.2)
B5-Mac Pro (10.9.2)
B5-MacBook Air (10.9.2)
B5-MacBook Pro (10.9.2)
B5-MacBook Retina (10.9.2)
Mac Loaner (10.9.2)
Target Mode Test


FILE SHARE DISTRIBUTION POINTS
* NeonShare
CasperShare
LibertyShare

View Type
All
Packages
Scripts
Printers
Directory Bindings
Dock Items
Adobe Installers/Updaters

Categories
All Categories
190 Printers
301B Printers
320C Printers
5CC Printers
75A Printers
7CC Printers
Accounts
Adobe
Apple
Base Software
Chembio
DNA Analysis
Dropbox
FileMaker
FTP
Genomics Software
Google
Java
JMP

☒ Show Items from Parent Configuration

Name	Type	Category	Priority	FUT	FEU	Indexed	Checksum
AD Bind	Built-In AD						
os-10.9.2 13C64...	DMG Package	Operating Systems	1	No	No	No	None
Fetch.dmg	DMG Package	FTP	8	Yes	Yes	Yes	2bbd80292bc7310490...
Flip4Mac.pkg	Apple Package	Base Software	8	No	No	Yes	d4099e7e62a89e612a...
Google Chrome.d...	DMG Package	Google	8	No	Yes	Yes	59ba1da51c26e1a356...
GraphPad Prism 6...	DMG Package	Base Software	8	No	Yes	Yes	c3f39ad9c617708c484...
Java 7 Update 55...	Apple Package	Java	8	No	No	No	None
Silverlight.pkg.zip	Apple Package	Base Software	8	No	No	No	d41d8cd98f00b204e9...
VLC Player.pkg	Apple Package	Base Software	8	No	No	Yes	None
7CClients7.1.0.5	Apple Package	Base Software	10	No	No	Yes	None

 B5-iMac (10.9.2)

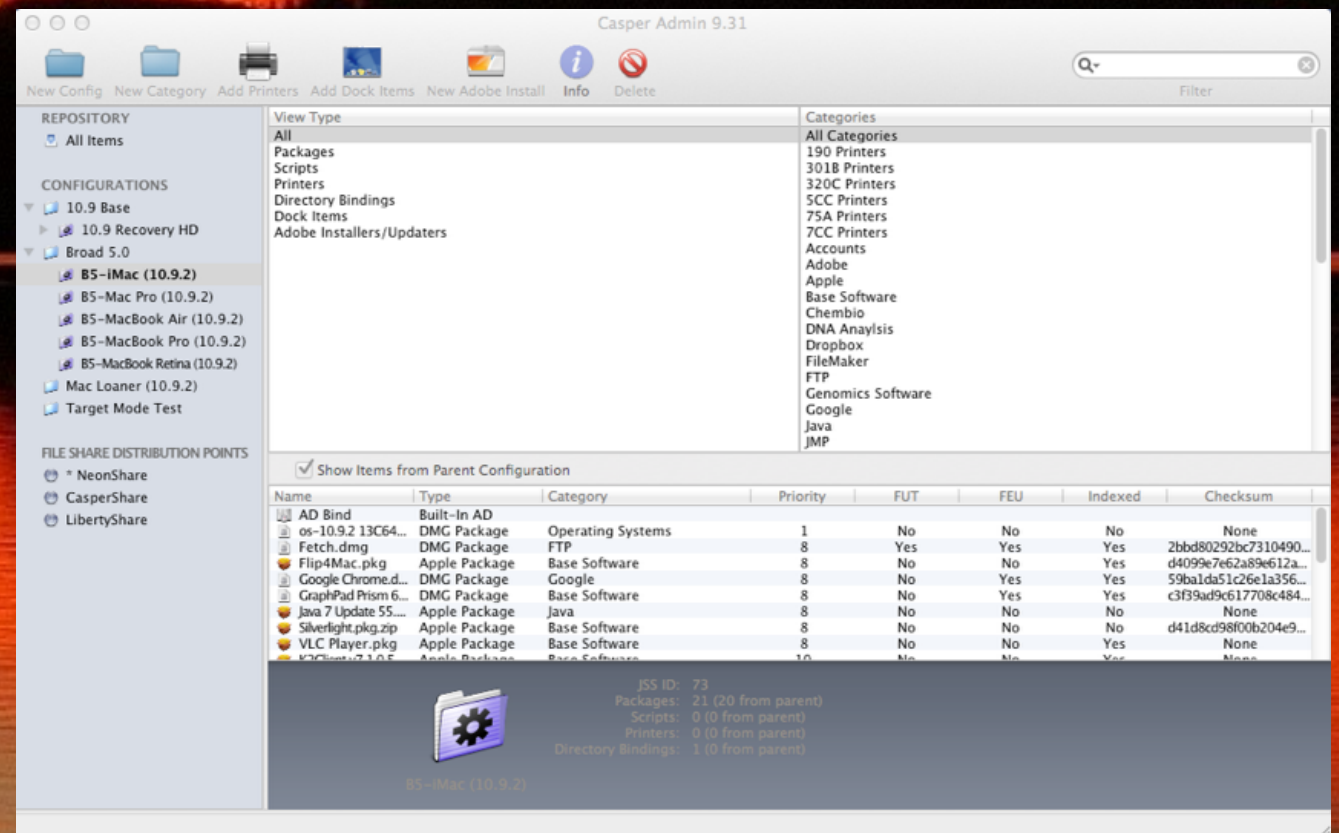
JSS ID: 73
Packages: 21 (20 from parent)
Scripts: 0 (0 from parent)
Printers: 0 (0 from parent)
Directory Bindings: 1 (0 from parent)

Casper Admin

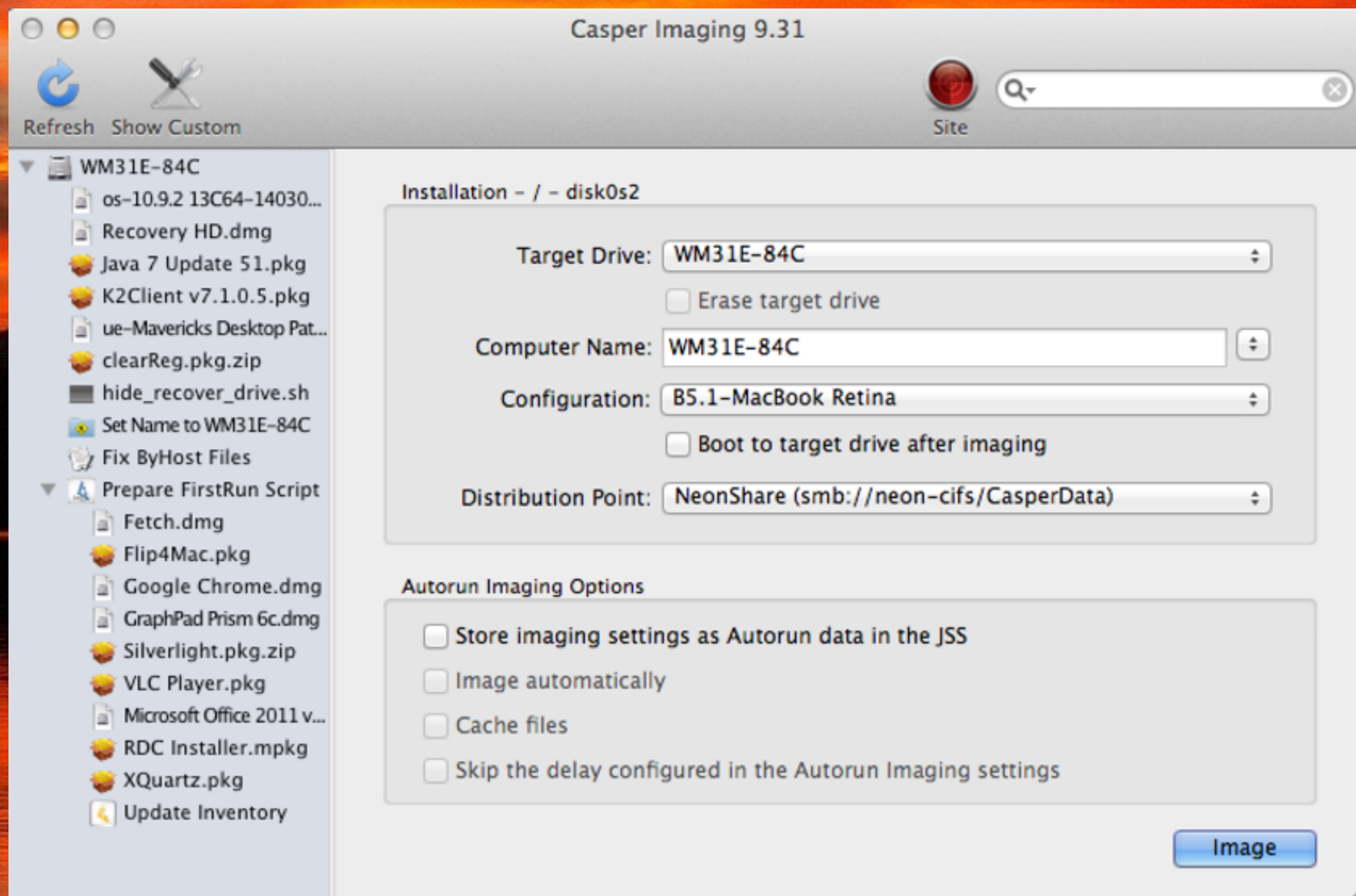
- OS Image separate from all software packages
- Parent and Child relationships
- Create partitions on the drive for different configurations (i.e. BootCamp)
- Allows you to choose a WinClone image for windows deployment

Casper Admin

- Accepts Composer built .dmg or .pkg formats
- Accepts commercial .pkg files
- Ability to create compiled images
- Local or Cloud based

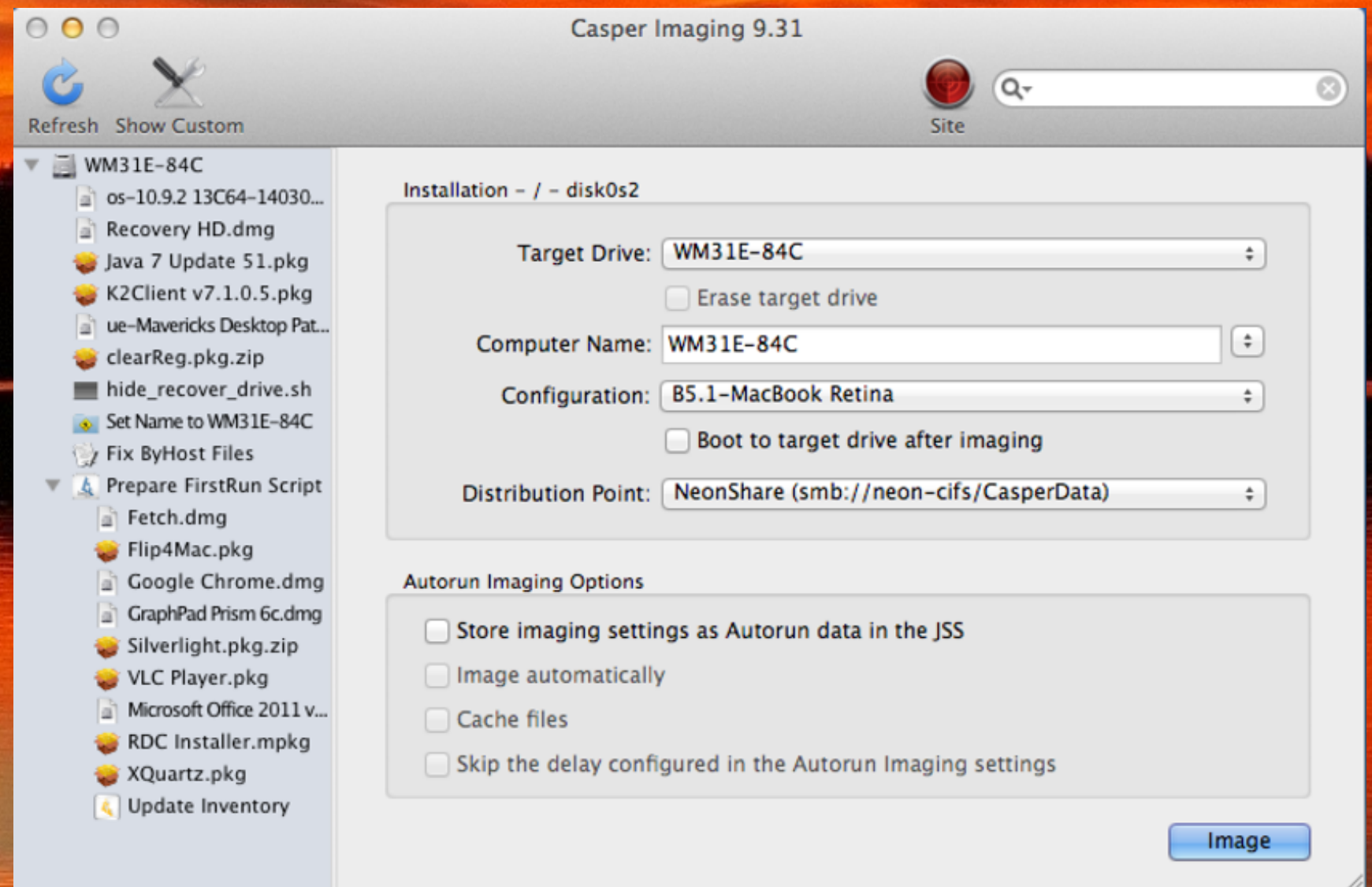


Casper Imaging



Casper Imaging

- Can be run from another partition or external drive
- Target Mode Imaging
- NetBooted



Creating .pkg Packages

- Creating packages may not be GUI friendly. CLI based
- Apple PackageMaker deprecated - 10.6



Other Package Formats

- Microsoft - no custom package format (needs post install attention)
- Adobe - own package format - AAMEE



Packaging

- Potentially use package from vendor
- Many third-party packaging tools
 - PackageMaker, pkgutil, Iceberg, Packages, The Luggage, JAMF Composer, InstallEase

JAMF
software



casper
SUITE

Casper Suite

- Management console = web browser



The screenshot shows the 'Self Service' web interface. On the left is a sidebar with links to 'Self Service', 'FileTransfer Appliance', 'JAMF JSS', 'JAMF Nation', 'JAMF Wikis', 'Web Help Desk', 'Webex - One Click Meetin', 'Apple Services', 'Box.com', 'Evernote', 'SalesForce', and 'WebEx'. The main area is titled 'Featured' and displays a grid of application tiles. Each tile includes an icon, the application name, and an action button (INSTALL, UPDATE, CONVERT, APP STORE, or IMAGE). The tiles include Box Edit, Box Sync, Casper Suite 8.7, Chatter Desktop for Mac, Convert an OVA Virtual Machine, CrashPlanPRO - JAMF, Get iBooks Author, Get Xcode, iMovie v9.0.9 Update, Install Winclone Pro, iPhoto v9.4.3 Update, iTunes 11.0.4, JAMF Thin Imaging Config - Demo Mac, Java for OS X, and JSSGrabber VM v7.0. On the right is a 'Categories' sidebar listing various software categories. Annotations with arrows point to specific tiles: 'Distribute Apple App Store apps.' points to 'Get iBooks Author' and 'Get Xcode'; 'Install any application, from any vendor, via Self Service.' points to 'Casper Suite 8.7'; and 'Update Apple App Store apps.' points to 'iMovie v9.0.9 Update'.

Distribute Apple App Store apps.

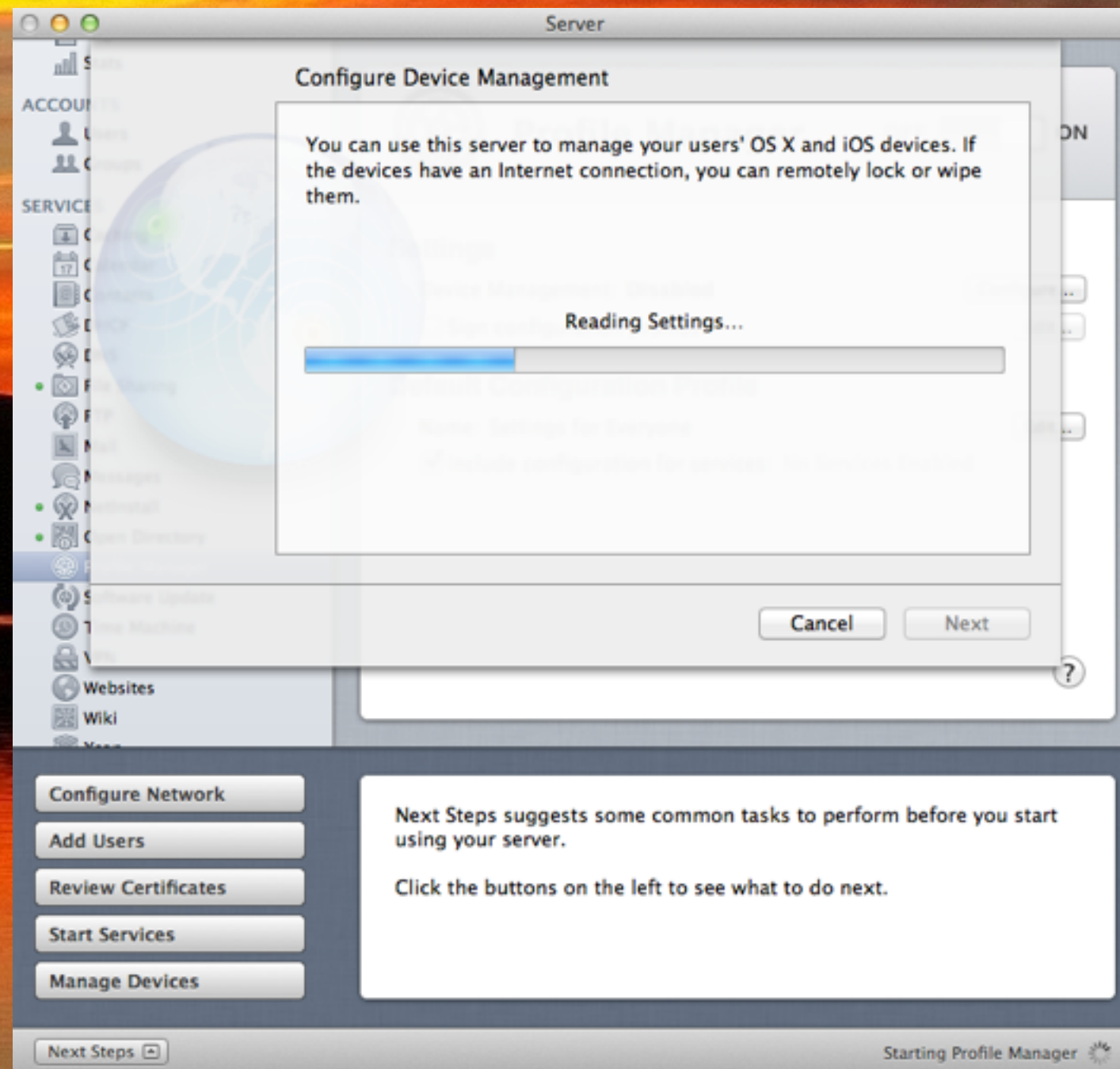
Install any application, from any vendor, via Self Service.

Update Apple App Store apps.

OS X Server

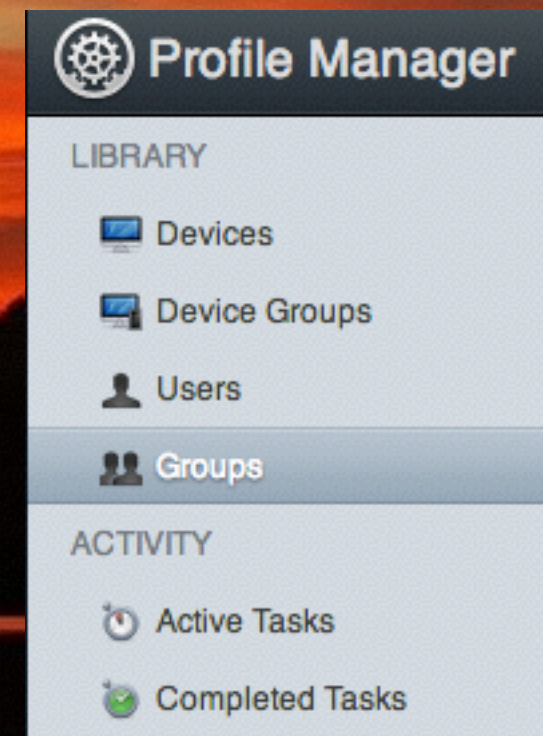


Configuration Profiles



Profile Manager

- Introduced OS X Lion
- Preference/Configuration Management
- Supported by many third-party MDMs



Caching Server

- Included in Server.app 2.2
- No control over which updates
- Useful if all clients access Internet from single IP



Apple Remote Desktop

- Remote Support/Screen Control
- Deployment
- Asset Management



ASR at the command line

- Doesn't work if network isn't set up for multicasting
- Proton Pack (a GUI tool for creating multicast ASR configurations)
- diskutil (is a native Apple command line utility for manipulating disks, partitions, and RAID sets)
- hdiutil (native Apple command line utility for working with disk images)
- ASR (Apple Software Restore; copy volumes — e.g. from disk images)

Third Party Review



DeployStudio

- Setup, create NetBoot images
- Manage configs/workflows
- Installed on your NetBoot image, runs workflows

Casper Suite

- Composer - build scripts and base OS
- Recon - scan/get machines enrolled
- Casper Admin - upload packages and build imaging workflows
- Casper Imaging - installed on your NetBoot image, runs workflows
- Casper Remote - remote assistance and instant installs
- Casper Self Service - User Installable software and tools

Munki

- Automates software installation
- Managed Software Update app (Self Service), doesn't require admin
- Doesn't require OS X Server (http)
- Google variant - Simian (App Engine)
- <http://code.google.com/p/munki> - free

Puppet

- You specify how you want things configured
- Puppet compares to your specifications
- Makes changes if necessary
- Incredibly useful for server configurations
- <http://www.puppetlabs.com>

Absolute Manage

- Based on old netOctopus, LANrev
- Completely cross-platform:
OS X, Windows, iOS, Android
- <http://www.absolutemanage.com> -
commercial

FileWave

- Cross-platform (OS X, Windows, iOS)
- Can run on an OS X, Windows, or Linux server
- Thunderbolt Imaging
- <http://www.filewave.com> - commercial

Which Tool?

- Use the one that works for you, at a price that you can afford
- Don't discount "free" software, but...
- Don't discount the ability to call someone if you're stuck

Apple's documentation

- <http://www.apple.com/support/osxserver/setupadministration/>
- http://images.apple.com/education/docs/1521219b_osx_deployment_guide_030513.pdf
- <http://www.apple.com/mac/volume-licensing/>

More documentation

- <http://www.afp548.com>
- <http://krypted.com>
- <http://www.mactech.com>
- <http://managingosx.wordpress.com/category/deployment/>

Questions?



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Leon H. Lincoln III

Leon is a System Administrator for the Broad Institute of MIT and Harvard which is a biomedical and genomic research center located in Cambridge, Massachusetts.

As a Certified Casper Administrator, Certified Casper Mobile Administrator, Apple Certified Technical Coordinator, and Microsoft Mac Office 2011 Expert he designs and implements the Apple environment at the Broad.

Along with the architectural responsibilities he also manages accounts for users (Active Directory, NIS and Google), maintains the Casper Self Service infrastructure, and provides many other services related to the Windows and Linux environments and acts as the senior escalation point for the Service Desk Team.

A featured speaker at many events including MacTech, MIT Partners and Mass Medical Society, Leon brings his extensive knowledge in the Apple arena to the New England area.

