

Deployment

Daniel J. Sellers

Daniel J. Consulting

Methods of Deployment



The Golden Master Mac

- Creating a master system for imaging
- Outdated method
- Ex. Must reinstall software that is already included in a new Mac.
- Need to test, test, and test again

The Golden Master Mac

- It takes time
- Time to create
- Updates = New Master
- Must use automated tools. Items need to be removed after imaging



Examples of Cloning



Still Using These?



No-image deployment

- Benefit: Fastest method of deployment
- Benefit: Doesn't require system-specific images
- Benefit: Ability to use Internet-restore.
- osxinstall.pkg (Greg Neagle's tool)

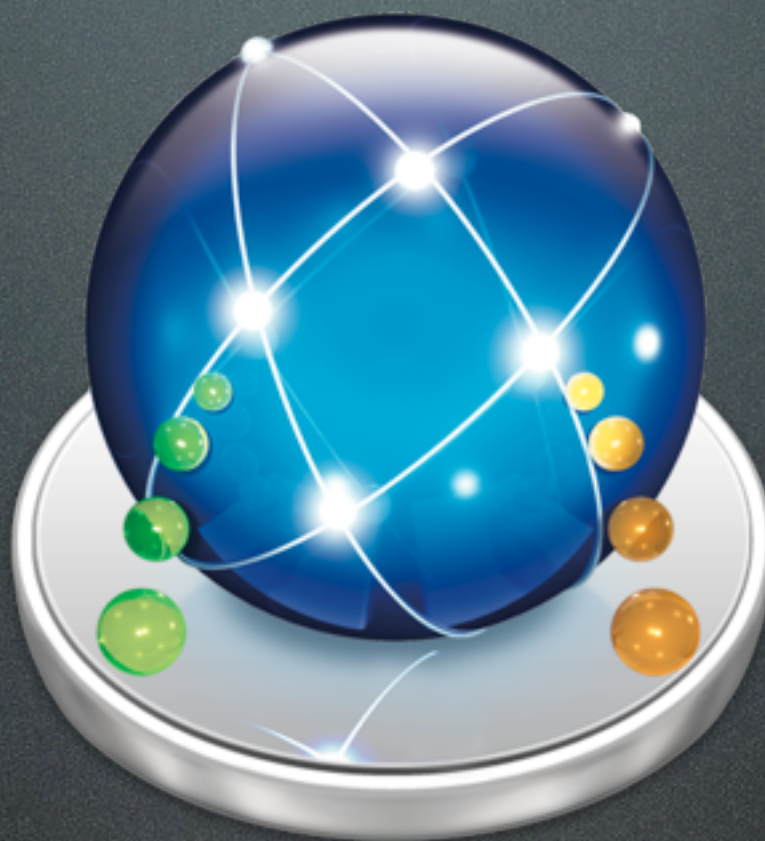
Third-party tools

- Munki
- Absolute Software
- Puppet (free VM demo) puppetlabs.com
- Casper tools (and others built on top of it like RobotCloud)
- InstaDMG
- Thin Imaging

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 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 connected to mainserver.pretendco.com". The interface includes a sidebar with navigation options: Runtime, Control, Logs, ACTIVITY, COMPUTERS, Lab, WORKFLOWS (selected), MASTERS, PACKAGES, and SCRIPTS. 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-4622-813B-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...	-	04062220-1111-8888-2222-000000000010

Below the table, a "Disk image" workflow is selected, showing configuration options:

- Source: [Empty text field]
- Type: Compressed - faster restoration, small footprint
- Format: Auto-detect
- Keywords: [Empty text field]
- 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

On the right, a list of tasks is visible, 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, Software update, Shut down, 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'. The status bar indicates 'DeployStudio Admin connected to mainserver.pretendco.com'. The left sidebar contains a tree view with categories: 'Runtime', 'Control', 'Logs', '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). 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-4622-8138-87011205F82E
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...	-	04062220-1111-8888-2222-000000000010

Below the table, a 'Disk image' icon is shown. The configuration area below the icon includes:

- Source: [Empty text field]
- Type: Compressed - faster restoration, small footprint (dropdown menu)
- Format: Auto-detect (dropdown menu)
- Keywords: [Empty text field]
- 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

At the bottom of the configuration area are 'Revert' and 'Save' buttons. On the right side of the window, a 'Task palette' lists various tasks with 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.

At the bottom right of the task palette, it says 'Drag an icon to the workflow timeline'.

Overlaid on the bottom right of the screenshot is a yellow text box with 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			C881578C-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' (unchecked) and 'Automate' (unchecked). A dropdown menu shows 'single-pass zero-fill (~4 hours for 500GB)'. At the bottom are 'Revert' and 'Save' buttons.

On the right side, there is a list of workflow tasks with 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, 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 'WORKFLOWS' category is selected, showing a list 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-4622-8138-87011205FB2E
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 list is a 'Restore' button with a red arrow icon. The configuration panel for the selected workflow shows:

- Target volume: Enter value... (dropdown) MacOSX
- Image: HFS (dropdown) macosx.hfs.dmg
- 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
 - Startup trigger: 0
 - Timeout: 0

On the right, a 'Workflow' panel lists various tasks with icons and 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. A 'clients' section shows 'minutes' and a 'Revert' button.

• Restore a master from a volume

Drag an icon to the workflow timeline

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).
- Top Panel:** A search bar and a table listing workflows.
- Workflow Table:**

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
- Workflow Configuration:**
 - Target volume:** Enter value... (dropdown) WINDOWS
 - Image:** NTFS (dropdown) windows.ntfs.gz
 - HFS only options:**
 - ☒ Don't check restoration (faster)
 - ☒ Rename ByHost prefs
 - ☒ Restore system recovery partitions
 - ☐ Enable multicast restoration
 - ☐ 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
 - Stream data rate:** 100 MBs
 - Client disk speed:** 125 MBs
 - Startup trigger:** 0 clients
 - Timeout:** 0 minutes
- Restore:** A visual representation of the workflow steps.

- Right Panel:** A library of tasks for the workflow timeline, including: 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.

• Triple OS Restoration (Windows)

Sample Workflow

The screenshot displays the DeployStudio Admin application window, titled 'DeployStudio Admin 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 (highlighted with a '5' badge), MASTERS, PACKAGES, and SCRIPTS (highlighted with a '5' badge).
- Table:** A list of workflows with columns: Title, Description, Access group, and Identifier. The 'Triple-OS restoration' workflow is selected and highlighted in blue.
- Workflow Configuration Panel:** Located below the table, it includes:
 - A 'Restore' button with a red arrow icon.
 - Fields for 'Target volume:' (set to 'LINUX') and 'Image:' (set to 'DEV' and 'linux.dd.gz').
 - A section for 'HFS only options:' with various checkboxes and sliders, 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' (set to 100 MBs), 'Startup trigger' (set to 0), 'Client disk speed' (set to 125 MBs), 'Timeout' (set to 0), 'Add generic BCD (Vista and later)', 'Expand restored NTFS volume', 'Set as default startup volume', and 'Automate'.
- Right Panel:** A grid of task 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'.

A yellow callout box with the text 'Triple OS Restoration (Linux)' is overlaid on the bottom right of the interface.

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

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 Meeting', '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 lines pointing to specific tiles are present: '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.

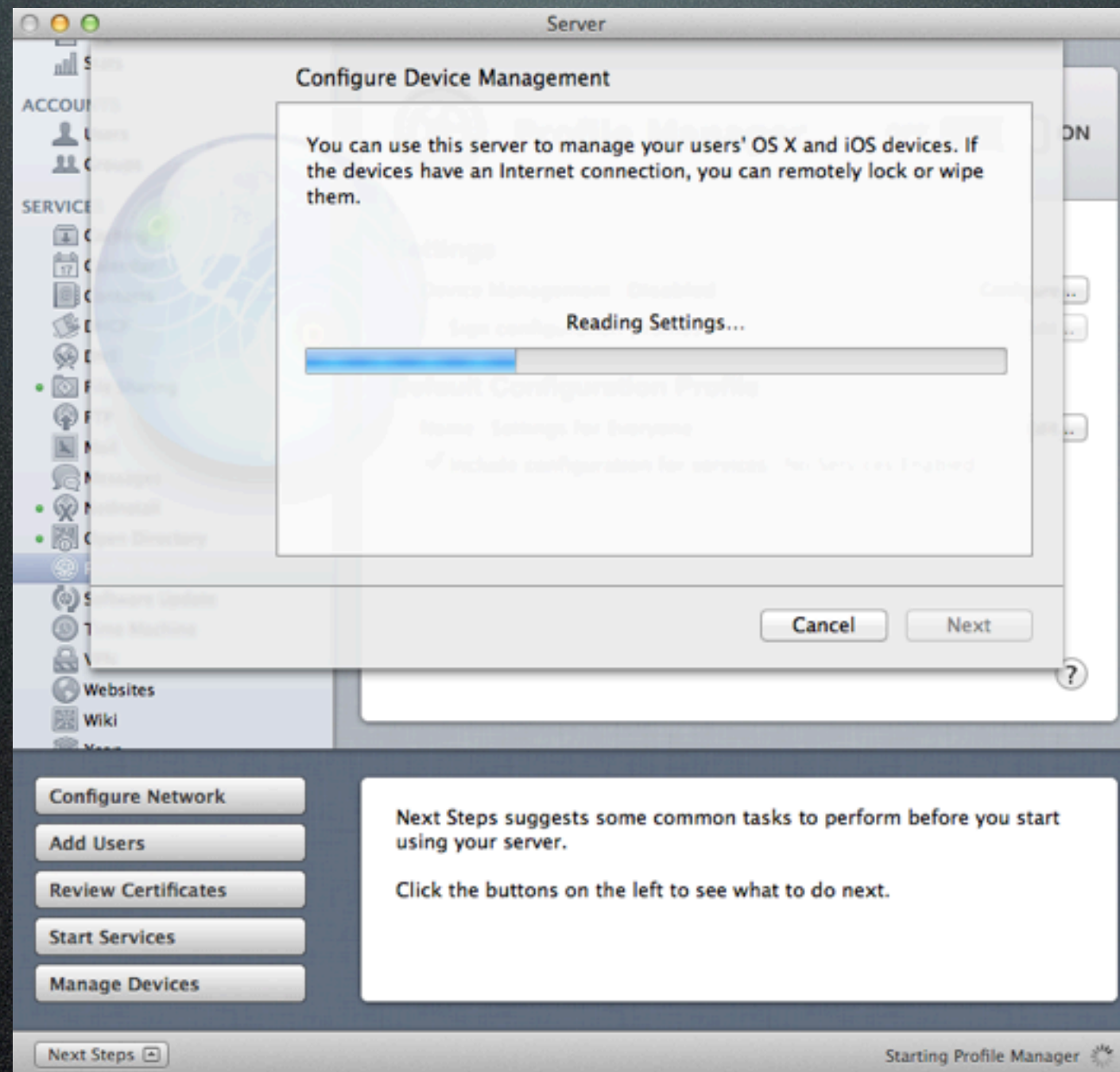


- Modular Approach
- Packages are Everything
- Casper Tools
- Casper Admin, Casper Imaging, Composer

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

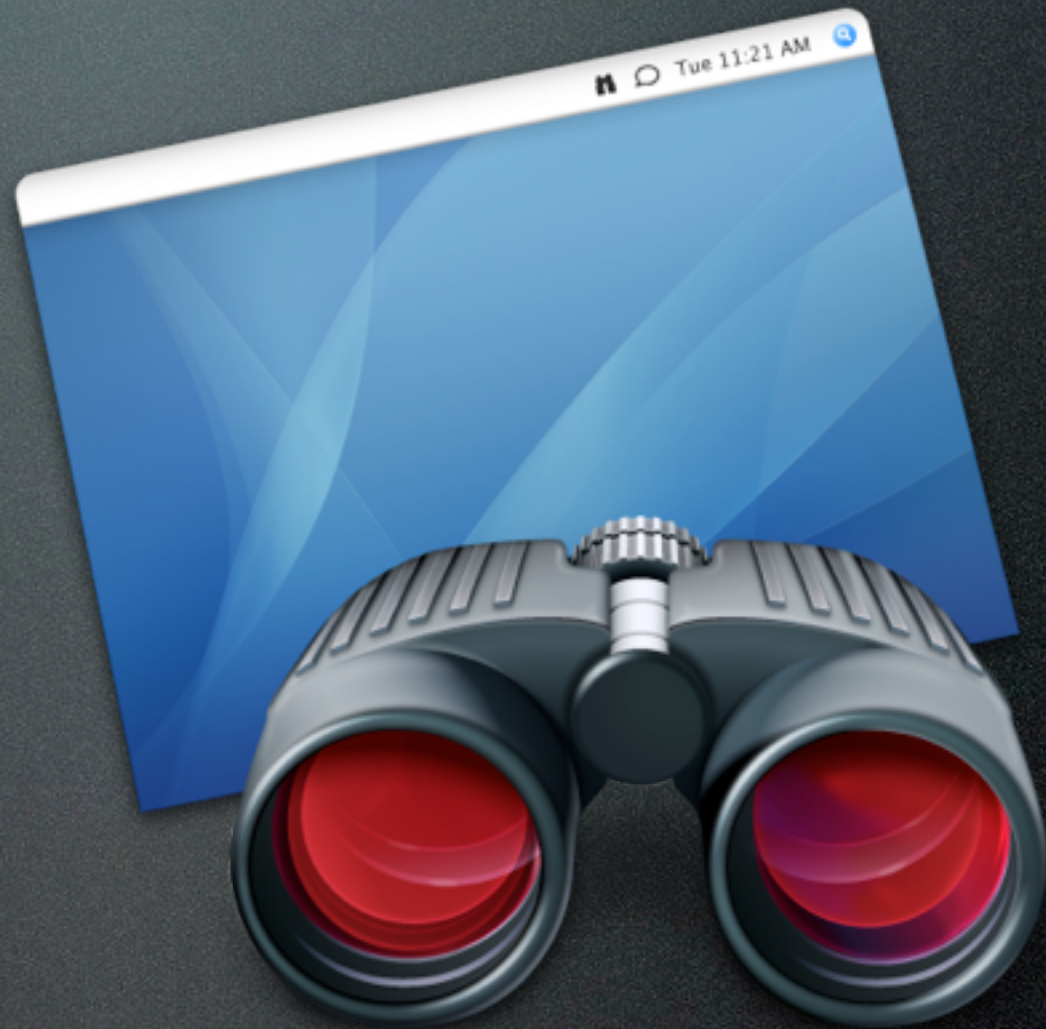


Apple Remote Desktop

Remote Support/Screen
Control

Deployment

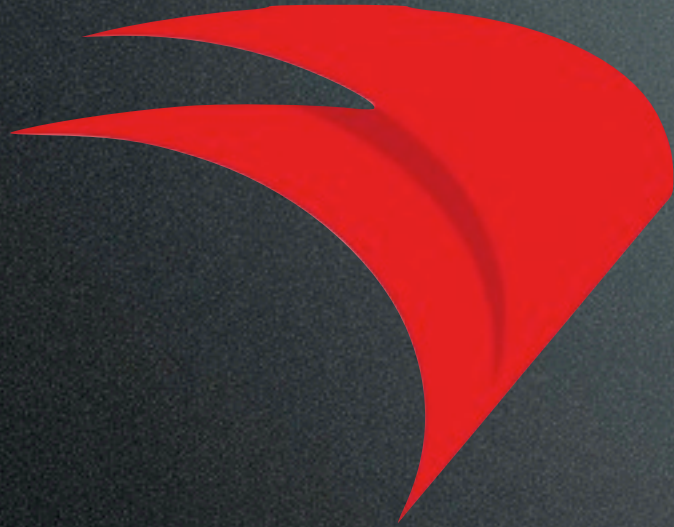
Asset Management



ASR at the command line

- Doesn't work if network isn't set up for multicasting
- Proton Pack
- diskutil
- hdiutil
- asr

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

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
- Lightning 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/>

Apple's documentation

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

Daniel Sellers

- danielsellers.com
- daniel@danielsellers.com
- Daniel J. Consulting
- Consultant, Instructor, and Trainer