


Deployment:


We Need To Talk



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UNIVERSITY OF
CALGARY

Inventors

Self-sufficient

Diverse Needs

Community

Terminology

Thin Imaging

Thin Imaging is when you...

1. Erase boot volume, apply a known good OS via a minimal disk image, then apply settings, configurations, and applications on top
2. Same as 1, except install the OS directly rather than use a disk image
3. Apply settings, configurations, and applications on top of a known good OS (e.g., OS applied at the factory)

1 & 2

1. Imaging or
2. Installing OS

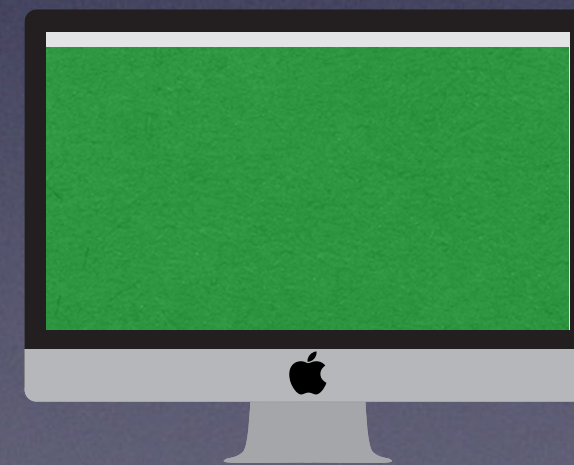
Customizing



Unknown



Known



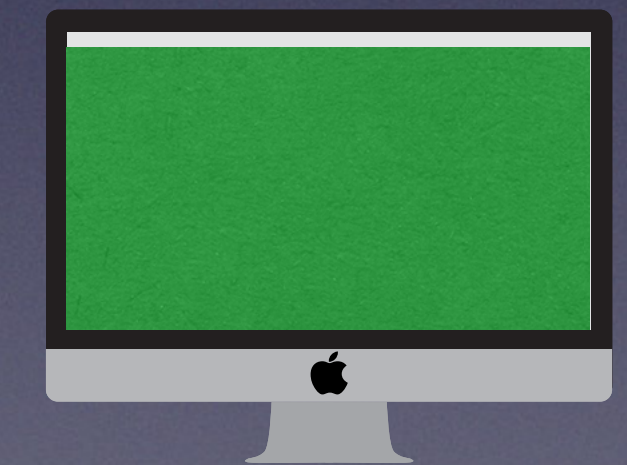
Desired

3

Customizing



Known



Desired

- Jamf APFS White Paper (registration required), 2017
 - ▶ www.jamf.com/resources/white-papers/everything-you-need-to-know-about-apple-file-system-apfs/
- Imaging will be dead (soon-ish) – Rich Trouton, 2017
 - ▶ derflounder.wordpress.com/2017/01/10/imaging-will-be-dead-soon-ish/
- Managing OS X blog – Greg Neagle, 2017
 - ▶ managingosx.wordpress.com
- Deployment: A Pedagogical Manifest(o) – Me, 2013
 - ▶ www.afp548.com/2013/05/21/deployment-a-pedagogical-manifesto/
- Deployment Workflows – Duncan McCracken, 2013
 - ▶ MacSysAdmin Conference; <http://docs.macsysadmin.se/2013/pdf/DeploymentWorkflows.pdf>
- DeployStudio: Tips, Tricks, and Alternate Uses – Rusty Myers, Brandon Penglase
 - ▶ Macworld Conference 2011 (no public source)

	1	2	3
<i>Jamf APFS 2017</i>	Modular Imaging	Modular Imaging?, Re-provisioning	Thin Imaging, Provisioning
<i>Trouton 2017</i>	Modular Imaging	Thin Imaging	Thin Imaging
<i>Neagle 2017</i>	(Imaging)	Installation-based workflow	Installation-based workflow
<i>Reimer 2013</i>	Minimal Common Image Deployment	Erase and Install	Customize Only, Install Only
<i>McCracken 2013</i>	Thin Imaging	(not specified)	No Imaging
<i>Penglase, Myers 2011</i>	Thin Imaging	Thin Imaging	Thin Imaging

Monolithic
Modular
Imaging
Deployment
Workflow

monolithic *adjective*

formed of a single large block of stone:
*later Byzantine columns were monolithic and
usually made of marble.*

Deployment History

Apple Software Restore

Mac OS 9

Mac OS X 10.2

Carbon Copy Cloner

NetRestore

InstaDMG

Modular image creation

00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18

Out of the Box

How to best create deployment images?

- Use disk images and packages
- Really, use packages, not scripts or hand-rolled collections of files
- Really, use packages
- Packagemaker, JAMF Composer, Iceberg, loggen

module *noun*

each of a set of standardized parts or independent units that can be used to construct a more complex structure, such as an item of furniture or a building:

ships are now built in modules rather than built in a whole from the base up.

Deployment History

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NetRestore

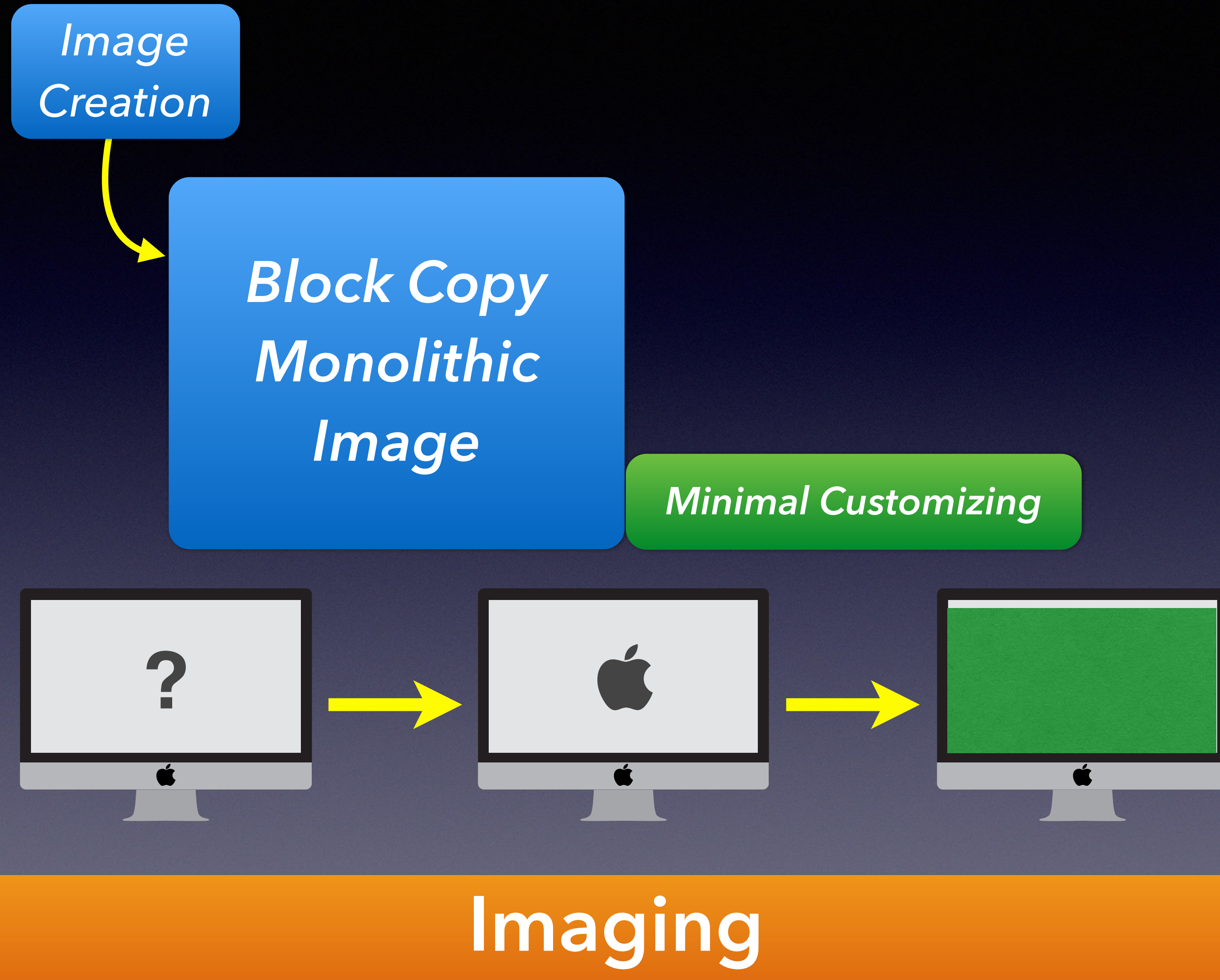
InstaDMG

Modular image creation

Munki

Monolithic Era

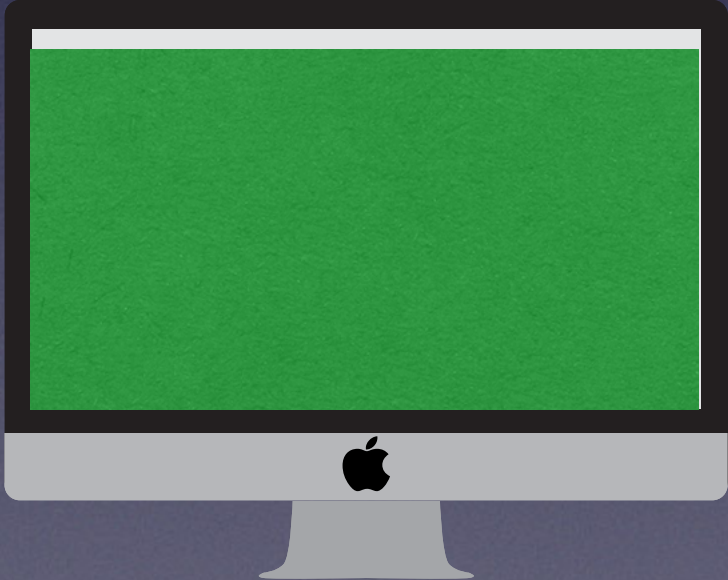
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18



*Image
Creation*

*Block Copy
Monolithic
Image*

Minimal Customizing



Imaging

Deployment History

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Mac OS 9

“Thin Imaging”

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Monolithic Era

00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18

Thin Imaging

- Use Custom and Retail Scripts & Packages
- Install On Top of OS X Base
- Easy to Configure
- Quick to Change



Target

- Existing Systems or Images
 - Use InstaDMG
 - Disk Utility
 - DeployStudio
- Existing System
- Out of Box



*Rusty Myers, Brandon Penglase – Macworld 2011
“DeployStudio: Tips, Tricks, and Alternate Uses”*

Deployment History

Apple Software Restore

Mac OS 9

“Thin Imaging”

The MacE Discussion

Mac OS X 10.2

Carbon Copy Cloner

NetRestore

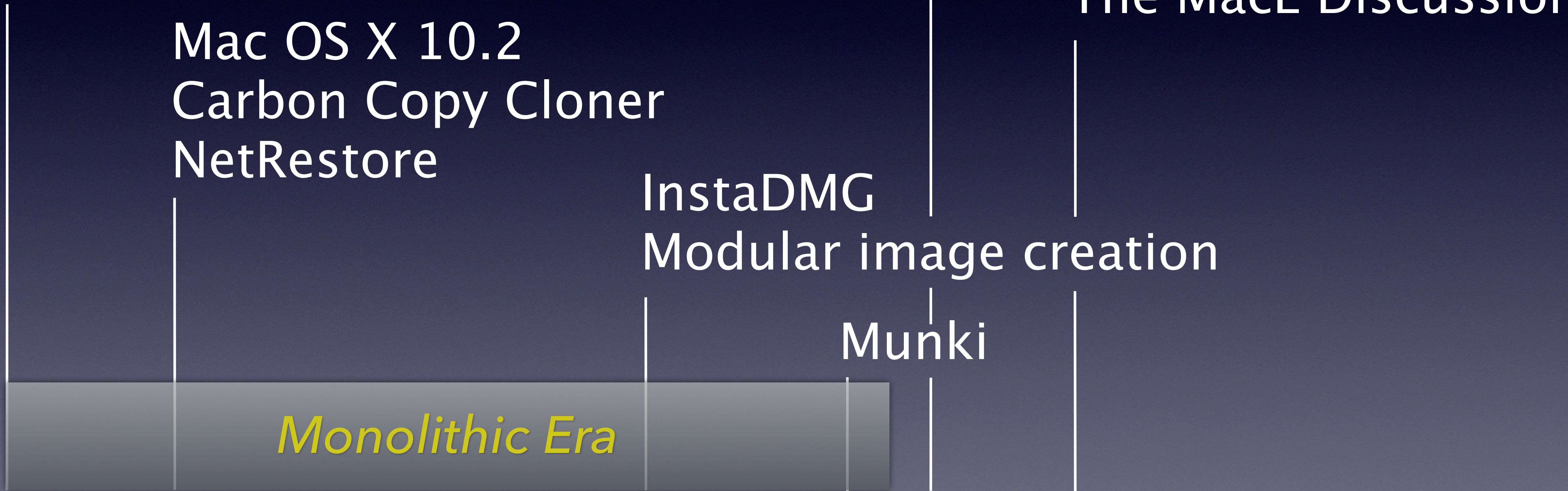
InstaDMG

Modular image creation

Munki

Monolithic Era

00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18



The MacE Discussion 2012

Ben Toms:

Sorry all but I'm getting confused with the thin imaging term here.

I thought the **imaging** terms were:

Monolithic (full image often cloned from a fully built system),

Modular (OS created using something like InstaDMG, apps & setting all separate),

Thin (No OS deployed as OS used is OS mac has installed, apps & settings delivered as per Modular imaging).

The MacE Discussion 2012

Greg Neagle:

I define "**Thin imaging**" as a lightweight variant of **modular imaging**. In a thin image, the image is built from the OS installer and a very small number of additional packages -- ideally just enough to bootstrap your software deployment mechanism (Munki, Casper, Absolute Manage, etc). There is still a disk image - it's just "thin".

"**No imaging**" is where you don't restore a disk image; instead you use the startup disk as it ships from Apple and just install the packages needed to bootstrap your software deployment mechanism.

Deployment History

Apple Software Restore

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“Deployment”

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Munki

Monolithic Era

00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18

deploy *verb*

bring into effective action

system deployment

implies moving a product from a temporary or development state to a permanent or desired state.

Deployment

Imaging

*Image
Creation
(optional)*

*Imaging or
Installing OS*

Customizing



Unknown



Known



Desired



Imaging Techniques

- Monolithic Imaging
- Modular Imaging
- Thin Imaging
- No Imaging



Deployment History

Apple Software Restore

Mac OS 9

Mac OS X 10.2

Carbon Copy Cloner

NetRestore

InstaDMG

Modular image creation

Munki

DEP, AutoPkg

“Thin Imaging”

The MacE Discussion

“Deployment”

AutoDMG

Monolithic Era

00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18



Imaging Is Dead

“But we’ve always done it that way!”

 John Kitzmiller

*John Kitzmiller – Mac Admins @ PSU 2014
The New Frontier of Apple Deployment and Management*

Deployment History

Apple Software Restore
Mac OS 9

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Mac OS X 10.2

Carbon Copy Cloner

NetRestore

“Deployment”

InstaDMG

AutoDMG

Modular image creation

Munki

DEP, AutoPkg

Monolithic Era

Automation Era

00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18

Post-imaging Era

Apple, Inc. support.apple.com/en-gb/HT208020

Upgrade macOS on a Mac at your institution

If you're the system administrator for your business or education institution, use these methods to upgrade macOS High Sierra.

Before you upgrade

You must be connected to the Internet when you upgrade your macOS. After your Mac confirms your connection, the Installer uses the model number of your Mac to locate and download a firmware update specific to only that Mac.

Only the macOS Installer can download and install the firmware update. Firmware updates can't be done on external devices, like those connected via Target Disk Mode, Thunderbolt, USB, or Firewire.

Upgrade macOS

You can use these supported methods to install macOS:

- Use the macOS Installer.
- Create a bootable installer. Learn how to [Create a bootable installer for macOS](#).
- Startup from macOS Recovery and [install macOS](#).
- Use System Image Utility and create a NetInstall image.

Installing macOS High Sierra on a Mac that is connected by [Target Disk Mode](#) isn't a supported installation method.

Learn more about [changes to secure kernel extensions in macOS High Sierra](#).

About monolithic system imaging

Apple doesn't recommend or support monolithic system imaging when upgrading or updating macOS.

Monolithic system imaging can only be used to re-install macOS, not to upgrade to a new macOS version.

If you try to use a monolithic system image, required firmware updates will be missing from the installation. This causes the Mac to operate in an unsupported and unstable state. You can use system images to re-install the existing operating system on a Mac.

<https://support.apple.com/en-gb/HT208020>

Learn more about [changes to secure kernel extensions in macOS High Sierra](#).

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<https://support.apple.com/en-gb/HT208020>

Deployment, Terminology

- macOS Deployment Reference

- ▶ *help.apple.com/deployment/macos/*

- Apple Style Guide

- ▶ *help.apple.com/applestyleguide/*



Apple Style Guide

- Upgrade

- ▶ *“a major, standalone version of a software product”*
- ▶ *e.g., Sierra 10.12 to High Sierra 10.13*

- Update

- ▶ *“something that updates a major version of software but doesn’t upgrade it to the next major version (if one exists)”*
- ▶ *e.g., 10.13.2 to 10.13.3, Security Update 2018-001*

monolithic
system imaging

	1	2
Monolithic		
Modular		
Thin		
Install Only	N/A	

workflow *noun*

the sequence of industrial, administrative, or other processes through which a piece of work passes from initiation to completion.



Workflow Questions

- What is your workflow for deploying a new Mac?
- What is your workflow for repurposing a Mac?
- What is your workflow for preparing a Mac for disposal?

Suggested by Greg Neagle



Workflow Types (User)

- Retail/Consumer
- 1-to-1, new computer
- Shared/Labs, new computer
- 1-to-1, used computer/new user
- Shared/Labs, used computer/new users
- BYOD, integrate corporate with personal



Workflow Types (Method)

- Image-dependent workflow
(cloned or modularly-built)
- Installation-based workflow



Method Questions

- Software collection & tools used
- Deployment automation & tools used
- Manual steps (remote or in person)

Deployment

Maintenance

Image Creation (optional)

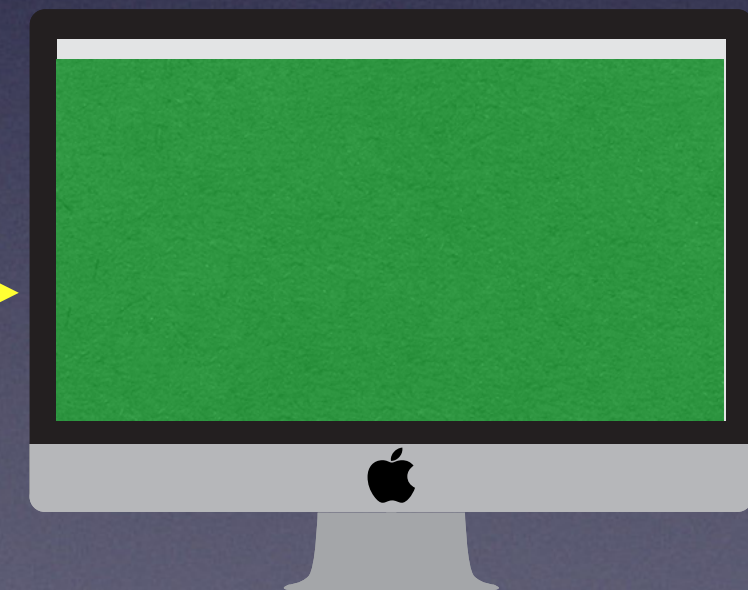
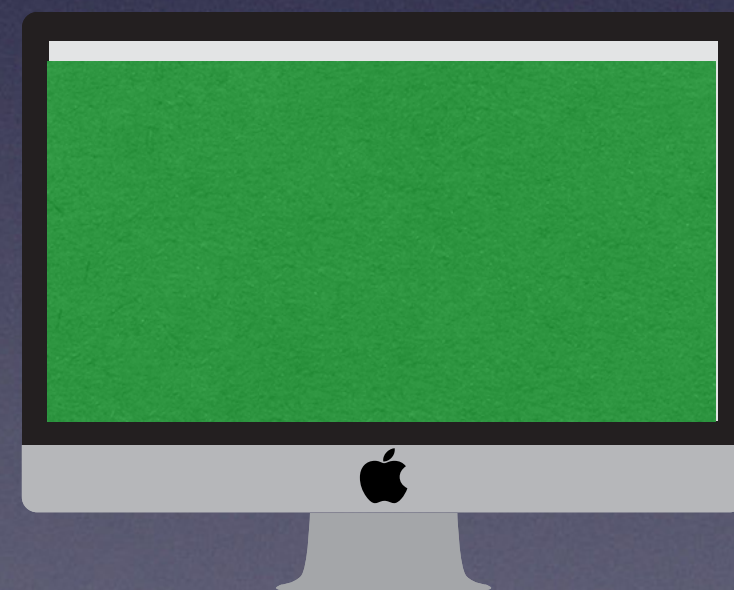
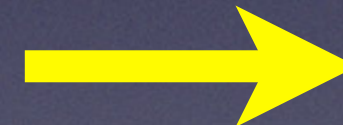
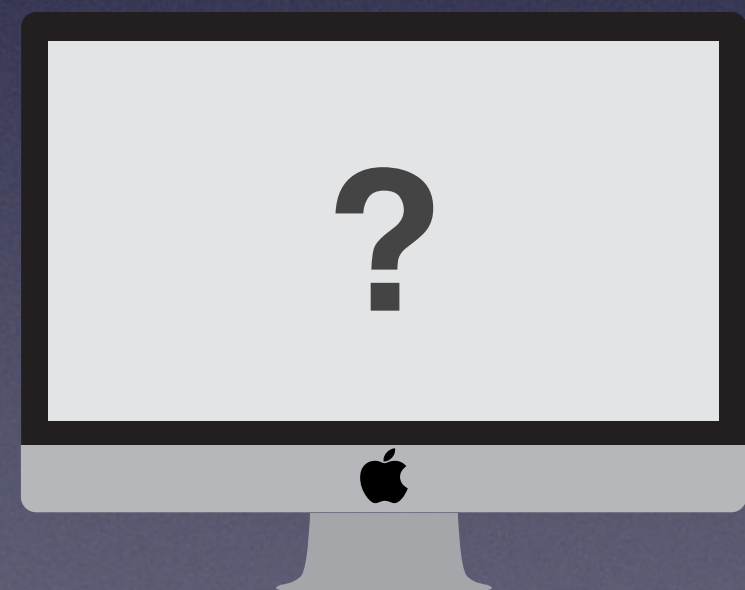
Collect Software

Collect Updates

Imaging or Installing OS

Customizing

Installing Updates & Upgrades

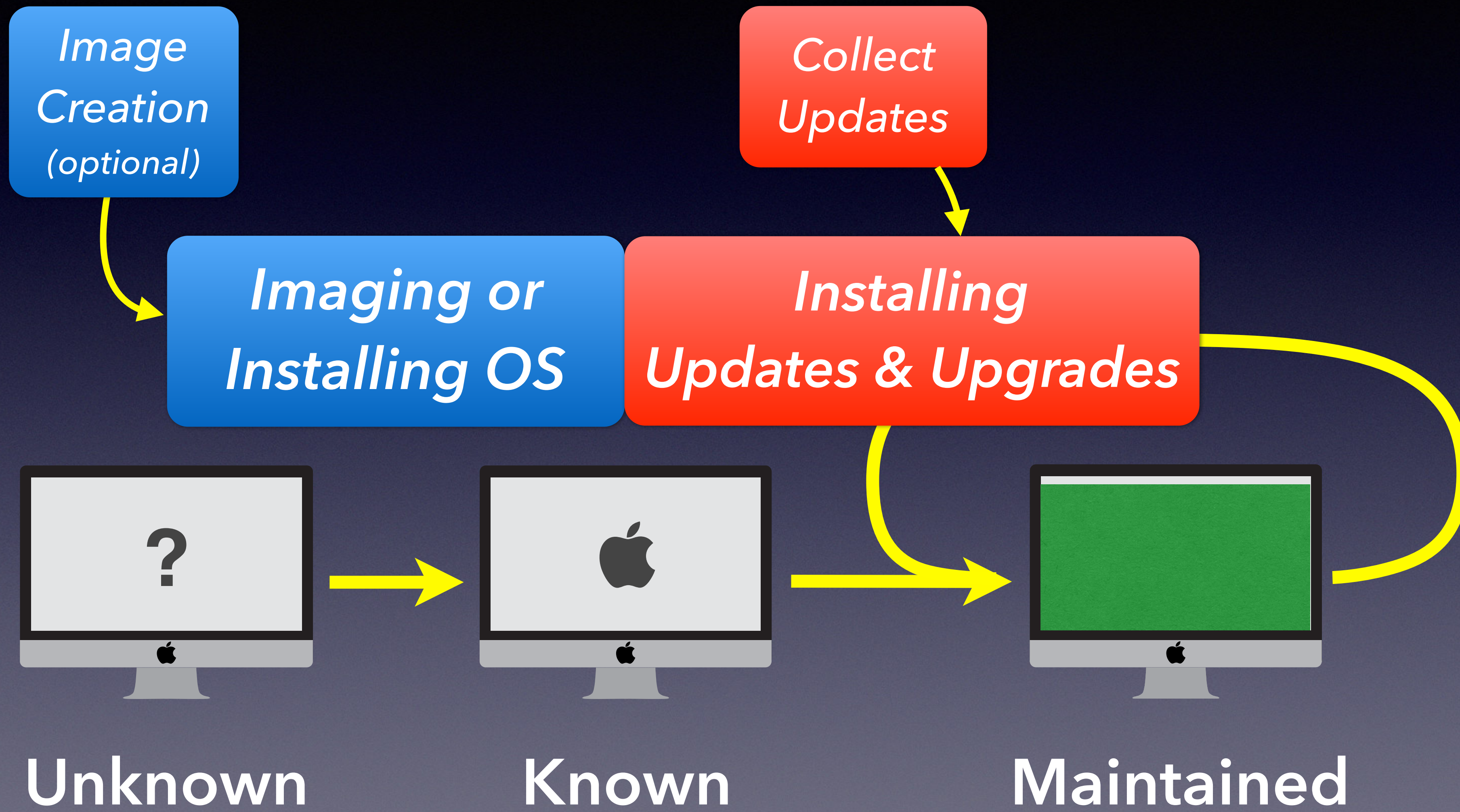


Unknown

Known

Desired

Maintained





Method Questions

- Which tools/methods are the same in initial deployment as they are in maintaining the computer?

Apple Deployment Programs

- For Business

- ▶ *DEP (enrol into an MDM)*
- ▶ *VPP / Apps and Books / Volume Store*
- ▶ *<https://help.apple.com/deployment/business/>*

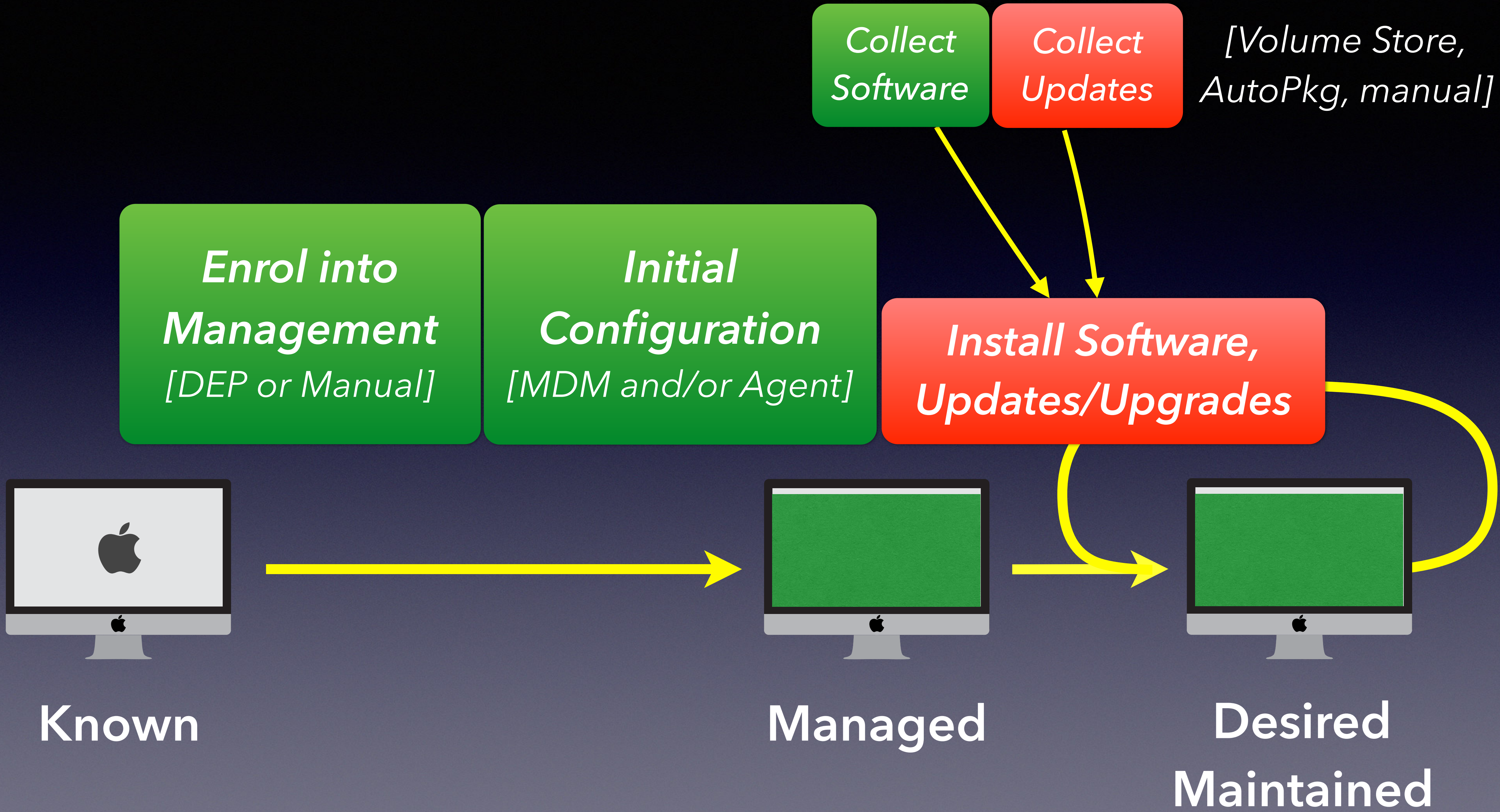
- For Education

- ▶ *Apple School Manager*
- ▶ *<https://help.apple.com/schoolmanager/>*

Apple Deployment Programs

- Availability by Country

▶ <https://support.apple.com/en-ca/HT207305>



MDM feature support

File Edit View Insert Format Data Tools Add-ons Help Last edit was made on January 18 by anonymous

100% \$ % .0 .00 123 Arial 10 B I S A

MDM command	First available in	Profile Manager	JAMF Pro ***	Meraki	Google	MicroMDM	Commandment	FileWave	VMware AirWatch	SimpleMDM	Jamf Now
AccountConfiguration	10.11										
AvailableOSUpdates	10.11		iOS & MacOS in 9.96					Only for iOS	iOS		
CertificateList	10.7										
DeviceConfigured	10.11										
DeviceInformation	10.7										
DeviceLock	10.7										
DeviceName	10.11										
EraseDevice	10.7										
InstallApplication	10.9	Only .app bundles	Only JAMF agent during DEP					Only VPP			
InstalledApplicationList	10.7										
InstallProfile	10.7										
InviteToProgram	10.9		Via Self Service or email	Pretty Sure							
OSUpdateStatus	10.11.5		v10.11 DEP only						iOS		
ProfileList	10.7										
ProvisioningProfileList	10.7 (Always empty)										
RemoveProfile	10.7										
Restrictions	10.7 (Always empty)										
ScheduleOSUpdate	10.11		iOS & MacOS in 9.96					Via Agent	iOS		
ScheduleOSUpdateScan	10.11		iOS & MacOS in 9.96					Via Agent	iOS		
SecurityInfo	10.9										
SetFirmwarePassword	10.13										
Settings	10.9										
UserList	10.13										
VerifyFirmwarePassword	10.13										

- Keys
- Unknown
- Planned support
- Partial support
- Supported
- Unsupported
- API/custom ability

<https://docs.google.com/spreadsheets/d/1zfd6wiO-UvfCXuUQdHXxCar7U9Exsp9TN2kq5GkYdxs/edit>



Session of Interest

- Imaging is Dead: What Now? – Greg Neagle
 - ▶ *Wed. @ 10:15, Screen 5*



More Workflow Questions

- Education or Business
- Enrolment via Apple (DEP or ASM) & MDM, just MDM, or no enrolment
- How do you make the software available?
(Install directed by you, user portal)

Your Workflows

Monolithic
Modular
Imaging
Deployment
Workflow


Special Thanks


- Rich Trouton
- Greg Neagle
- Nick McSpadden
- Nick Thompson
- Rusty Myers
- Ben Toms
- Pepijn Bruienne

Blog:
maclabs.jazzace.ca

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