

Modular Image Creation



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Session Overview

- Why image? Why modularly?
- Techniques needed for modular
- Modular image creation tools
- Advanced AutoDMG

Why image?



Why image?

Why automate?

Why use images
(to deploy)?

Create a base system image for recovery

Create a base system image for testing

When does imaging make sense?

When does any methodology make sense? When it's the best solution.

Environments that are often reset

Environments that are truly homogenous

Kevin M. White @ MacSysAdmin 2013
"Modern Trends in Apple Management"



Why image?

- Create a base system image
- Environments that are often reset
- Truly homogenous environments
- When speed or bandwidth of (re)deployment matters
- Large (local) static elements

Why image *modularly*?



SEPT

12



OS X 10.8.5

SEPT
24



OS X 10.8.5



OS X 10.8.5
Custom Build

SEPT
24



OS X 10.8.5



OS X 10.8.5
Custom Build



Non-modular way

1. Download OS installer for model via Internet Recovery
2. Erase drive and reinstall OS
3. Install existing image onto an external drive
4. Connect that external drive to the target Mac
5. Boot into newly installed OS and use Migration Assistant to bring over content from existing image
6. Make an image of the new machine for other Macs with the same OS build



Modular way

1. Download OS installer for model
(or make a backup of never-booted drive)
2. Swap OS installer in your modular build workflow and generate new image
3. Deploy image as usual



“Install Only” Way

1. Install software load as usual using automated tool (e.g., Munki)

I DON'T ALWAYS CREATE IMAGES



**BUT WHEN I DO, I CREATE THEM
MODULARLY!**



Another Case

	Before	After
OS	10.6.8	10.8.2 (12C60) 10.8.2 (12C2034)
Key Apps	Final Cut Pro 7 Motion 4	Final Cut Pro X Motion 5
Existing/New Macs	16/5	
Staff	1 skilled	
Notes	Reported that FCP 7 and FCP X conflict when installed on same boot volume	



Modular Advantages

- Never booted, cruft-free
- Easy to change OS / software
- Self-documenting
- Packages are useful elsewhere
- Multiple payload variations can be managed



AutoDMG In Action!



Demo Ingredients

- AutoDMG
 - ▶ github.com/MagerValp/AutoDMG
- OS Installer (*same as booted OS*)
- CreateUserPkg
 - ▶ github.com/MagerValp/CreateUserPkg
- Anything else you'd like to add
 - ▶ *pkg, dmg with app or pkg, app*

Messages

Per Olofsson



Per, what is your preferred pronunciation for AutoDMG? (I presume "Auto Damage" was a joke.) Auto D-M-G? Auto D'image? Auto Image?



2014-05-29, 8:48 PM



It was a joke, but it kinda stuck :)

2014-05-29, 11:12 PM



CreateUserPkg

Untitled

Full Name:

Account name:

Password:

Verify:

User ID: Account type:

Home directory:

UUID:

Automatic login

Package ID: Version:

/Library/User
Pictures

Shared

FAVORITES

- Applications
- Desktop
- Downloads
- Shared
- HFS
- tech

DEVICES

SHARED

TAGS

- Installers
- OSInstallers
- Templates

3 items, 885.09 GB available

AutoDMG

Drop OS X Installer Here

Apply updates

Download

Additional software:

Build



Finder OS X 10.9.3

OS X 10.9.2
OS X 10.9.3

Install OS X Mavericks

1 item, 885.11 GB available

FAVORITES
Applications
Desktop
Downloads
Shared
HFS
tech

DEVICES
SHARED
TAGS

AutoDMG

Mac OS X 10.9.3 13D65

Apply updates

- iBooks Update
- BookKit Update
- iTunes 11.2.1
- Safari 7.0.4 for Mavericks

All updates downloaded Download

Additional software:

Build



Installers

FAVORITES: Applications, Desktop, Downloads, Shared, HFS, tech

DEVICES, SHARED, TAGS

- Installers
- OSInstallers
- Templates

- Musescore-1.5.dmg
- Office 2011 14.4.1.pkg
- Office2Templ.pkg
- OSCforMax61.pkg
- ProAppsQTCodecs.dmg
- ProAudioC...ff07765.pkg
- QT7_serial.pkg
- QuickTime...Leopard.pkg
- RAWCamer...te5.05.dmg
- Sibelius 7.1...erDisc.dmg
- SpectraVie...English.dmg
- SpectraVie...English.dmg
- TextWrangler_4.5.8.dmg
- TouchOSC Editor.pkg
- Vectorworks2012Help.pkg
- vlc-2.1.4.dmg
- VW2012 M...s Patch.pkg
- VW2012.pkg
- Wacom Tab...amboos.pkg
- Wacom Tablet Intuos.pkg
- XeroxPrinterDrivers.pkg

55 items, 885.11 GB available

AutoDMG

Mac OS X 10.9.3 13D65

Apply updates

- iBooks Update
- BookKit Update
- iTunes 11.2.1
- Safari 7.0.4 for Mavericks

All updates downloaded Download

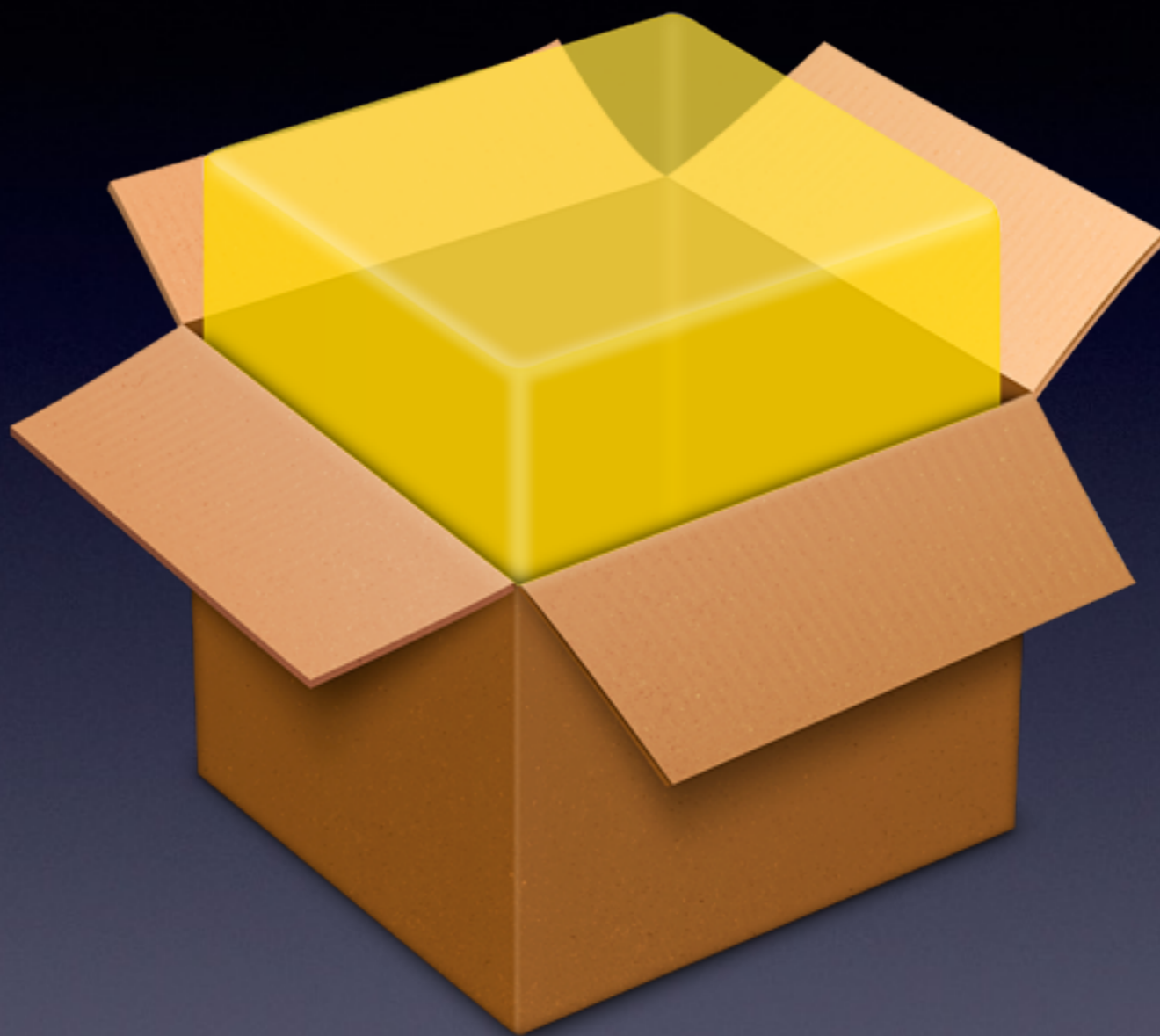
Additional software:

- clearReg.pkg
- create_tech_2014.pkg
- TextWrangler_4.5.8.dmg

Build



Techniques for Modular





When Packages Fail

Assume

- Being installed on a booted volume
- Being run from the GUI
- A user is currently logged in



When Packages Fail

Solution:

- Repackage
- Modify Original Package
- Deploy somewhere else in the workflow



Packages that Fail in Images

- Adobe CS/CC (w/AAMEE, CCP)
- Microsoft Office 2011/365
- iLife '11



Packaging Tips

- Build using same users & permissions
- Segregate user-based and system-based files
- Use for serialization
(volume / site licences)



Modular Image Creation Tools



Modular Image Creation Tools

Boot OS = Build OS

(major release)



Modular Image Creation Tools



- InstaDMG (+ InstaUp2Date)
 - ▶ *Kuehn, Wisenbaker, Banks et al*
 - ▶ *afp548.com/category/instadmig/*
 - ▶ *OS X 10.5 - 10.8 only*
 - ▶ *CLI*
- InstaDMG 10.9 fork
 - ▶ *Yoann Gini*
 - ▶ *<https://github.com/ygini/InstaDMG>*



Modular Image Creation Tools



- System Image Utility/NetRestore
 - ▶ *Apple*
 - ▶ *in /System/Library/CoreServices/
(or Server Admin Tools in 10.7 and earlier)*
 - ▶ *GUI*
 - ▶ *Extract .dmg from .nbi generated (mount
SetName.nbi/NetInstall.dmg,
then grab /Packages/System.dmg)*



Modular Image Creation Tools

- can haz image
 - ▶ *Google*
 - ▶ *https://code.google.com/p/google-macops/wiki/can_haz_image_manual*
 - ▶ *CLI*



Modular Image Creation Tools

- **stew**

- ▶ *Joseph Chilcote*

- ▶ *<https://github.com/chilcote/stew>*

- ▶ *CLI*

- ▶ *"...stew is useful to myself and anyone with my particular automation needs. I would definitely recommend AutoDMG first."*



Modular Image Creation Tools


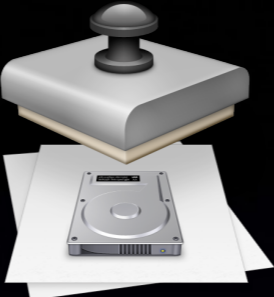



- AutoDMG

- ▶ *Per Olofsson*

- ▶ *<https://github.com/MagerValp/AutoDMG>*

- ▶ *GUI, CLI*

	 InstaDMG	 SIU/NR	can haz image	 stew	AutoDMG
Admin UI	CLI + text files	GUI	CLI	CLI + text file	GUI, CLI + plist
Payload	pkg dmg w/app dmg w/pkg	pkg sh user accounts	pkg dmg w/app	pkg dmg w/pkg	pkg dmg w/app dmg w/pkg app
Automate	Catalogs (+Nested)	Automator Workflow	Folder Structure	Catalogs (flat)	Templates (+Nested)
Requires	10.5+, Python	extracting the dmg	Webserver, Python 2.7	10.9+, Python 2.7	10.7+



Time to peek in the
digital oven...



Advanced AutoDMG



Cached OS Install

- Replicates a popular feature in InstaDMG (only better)
- A demo is worth a thousand words...



Cached OS Install

- Great for testing
 - ▶ *Saves ~20 min*
 - ▶ *Build final from scratch (best practice)*



Templates

- Save from GUI
- Make/modify your own



Templates

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE plist PUBLIC "-//Apple//DTD PLIST 1.0//EN" "http://
www.apple.com/DTDs/PropertyList-1.0.dtd">
<plist version="1.0">
<dict>
  <key>AdditionalPackages</key>
  <array>
    <string>/Users/Shared/Installers/clearReg.pkg</string>
    <string>/Users/Shared/Installers/create_tech_2014.pkg</string>
    <string>/Users/Shared/Installers/TextWrangler_4.5.8.dmg</string>
  </array>
  <key>ApplyUpdates</key>
  <true/>
  <key>SourcePath</key>
  <string>/Users/Shared/OSInstallers/OS X 10.9.3/Install OS X
Mavericks.app</string>
  <key>TemplateFormat</key>
  <string>1.0</string>
  <key>VolumeName</key>
  <string>Macintosh HD</string>
</dict>
</plist>
```



IncludeTemplates

- Added by editing .adtmpl file
- No limit to nesting
- Run from CLI or GUI


```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE plist PUBLIC "-//Apple//DTD PLIST 1.0//EN" "http://www.apple.com/
DTDs/PropertyList-1.0.dtd">
<plist version="1.0">
<dict>
  <key>IncludeTemplates</key>
  <array>
    <string>/Users/Shared/Templates/iaml_payload.adtmpl</string>
  </array>
  <key>ApplyUpdates</key>
  <true/>
  <key>SourcePath</key>
  <string>/Users/Shared/OSInstallers/OS X 10.9.3/Install OS X Mavericks.app</
string>
  <key>TemplateFormat</key>
  <string>1.0</string>
  <key>VolumeName</key>
  <string>IAML-Mav</string>
</dict>
</plist>
```

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE plist PUBLIC "-//Apple//DTD PLIST 1.0//EN" "http://www.apple.com/
DTDs/PropertyList-1.0.dtd">
<plist version="1.0">
<dict>
  <key>IncludeTemplates</key>
  <array>
    <string>/Users/Shared/Templates/tech-labs.adtmpl</string>
    <string>/Users/Shared/Templates/fau-labs.adtmpl</string>
    <string>/Users/Shared/Templates/Java6.adtmpl</string>
    <string>/Users/Shared/Templates/Office2011_no_Outlook.adtmpl</string>
    <string>/Users/Shared/Templates/internet.adtmpl</string>
    <string>/Users/Shared/Templates/iLife.adtmpl</string>
    <string>/Users/Shared/Templates/iWork.adtmpl</string>
    <string>/Users/Shared/Templates/notation.adtmpl</string>
    <string>/Users/Shared/Templates/modelling.adtmpl</string>
    <string>/Users/Shared/Templates/audio.adtmpl</string>
    <string>/Users/Shared/Templates/video-animation.adtmpl</string>
    <string>/Users/Shared/Templates/printers-iaml.adtmpl</string>
  </array>
  <key>TemplateFormat</key>
  <string>1.0</string>
</dict>
</plist>
```

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE plist PUBLIC "-//Apple//DTD PLIST 1.0//EN" "http://www.apple.com/
DTDs/PropertyList-1.0.dtd">
<plist version="1.0">
<dict>
  <key>AdditionalPackages</key>
  <array>
    <string>/Users/Shared/Installers/iDVD final.pkg</string>
    <string>/Users/Shared/Installers/iDVDExtraContent.pkg</string>
    <string>/Applications/iMovie.app</string>
    <string>/Applications/iPhoto.app</string>
    <string>/Users/Shared/Installers/RAWCameraUpdate5.05.dmg</string>
  </array>
  <key>IncludeTemplates</key>
  <array>
    <string>/Users/Shared/Templates/GarageBand2013.adtmpl</string>
  </array>
  <key>TemplateFormat</key>
  <string>1.0</string>
</dict>
</plist>
```




IncludeTemplates

- Parses IncludeTemplates before AdditionalPackages within the same template

Template 0:



Template 1:



Template 2:



Template 3:



Template 0:

T1

T2



Template 1:

T3



Template 2:

21

22



Template 3:

31

32








Drop OS X Installer Here

Apply updates

Download

Additional software:

- | | |
|---|---------------------------|
|  | vlc-2.1.4.dmg |
|  | MPEG_Streamclip_1.9.2.dmg |
|  | Keynote.app |
| | |
| | |



Build

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE plist PUBLIC "-//Apple//DTD PLIST 1.0//EN" "http://www.apple.com/
DTDs/PropertyList-1.0.dtd">
<plist version="1.0">
<dict>
  <key>AdditionalPackages</key>
  <array>
    <string>/Users/Shared/Installers/vlc-2.1.4.dmg</string>
    <string>/Users/Shared/Installers/MPEG_Streamclip_1.9.2.dmg</string>
    <string>/Applications/Keynote.app</string>
  </array>
  <key>ApplyUpdates</key>
  <false/>
  <key>TemplateFormat</key>
  <string>1.0</string>
  <key>VolumeName</key>
  <string>Macintosh HD</string>
</dict>
</plist>
```

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE plist PUBLIC "-//Apple//DTD PLIST 1.0//EN" "http://www.apple.com/
DTDs/PropertyList-1.0.dtd">
<plist version="1.0">
<dict>
  <key>AdditionalPackages</key>
  <array>
    <string>/Users/Shared/Installers/vlc-2.1.4.dmg</string>
    <string>/Users/Shared/Installers/MPEG_Streamclip_1.9.2.dmg</string>
    <string>/Applications/Keynote.app</string>
  </array>

  <key>TemplateFormat</key>
  <string>1.0</string>

</dict>
</plist>
```



AutoDMG Miscellany

- Updates catalogue
 - ▶ *Deprecates all but the latest version of the OS (10.7.5, 10.8.5, 10.9.3)*
 - ▶ *Per does the updating, but you can fork your own (for faster or slower service)*
 - ▶ *~/Library/Application Support/AutoDMG/UpdateProfiles.plist*



AutoDMG Miscellany

- Designed for “Thin” or smaller common images
- Build supporting Yosemite already available (NDA forums)

MacDeployment 2014