

# Scripting OS X

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**Packaging**



**@scriptingosx** packaging is dead.

(DEP + VPP + Profiles)

× MDM

=

no packages

# still require packages

- Adobe
- MS Office
- Printer Drivers
- plug-ins

# still require packages

- Adobe
- MS Office
- Printer Drivers
- plug-ins
- AutoCad
- MATLAB
- Firefox, Chrome
- VMware + tools
- AnyConnect
- Xcode
- GarageBand
- Logic

# still require packages

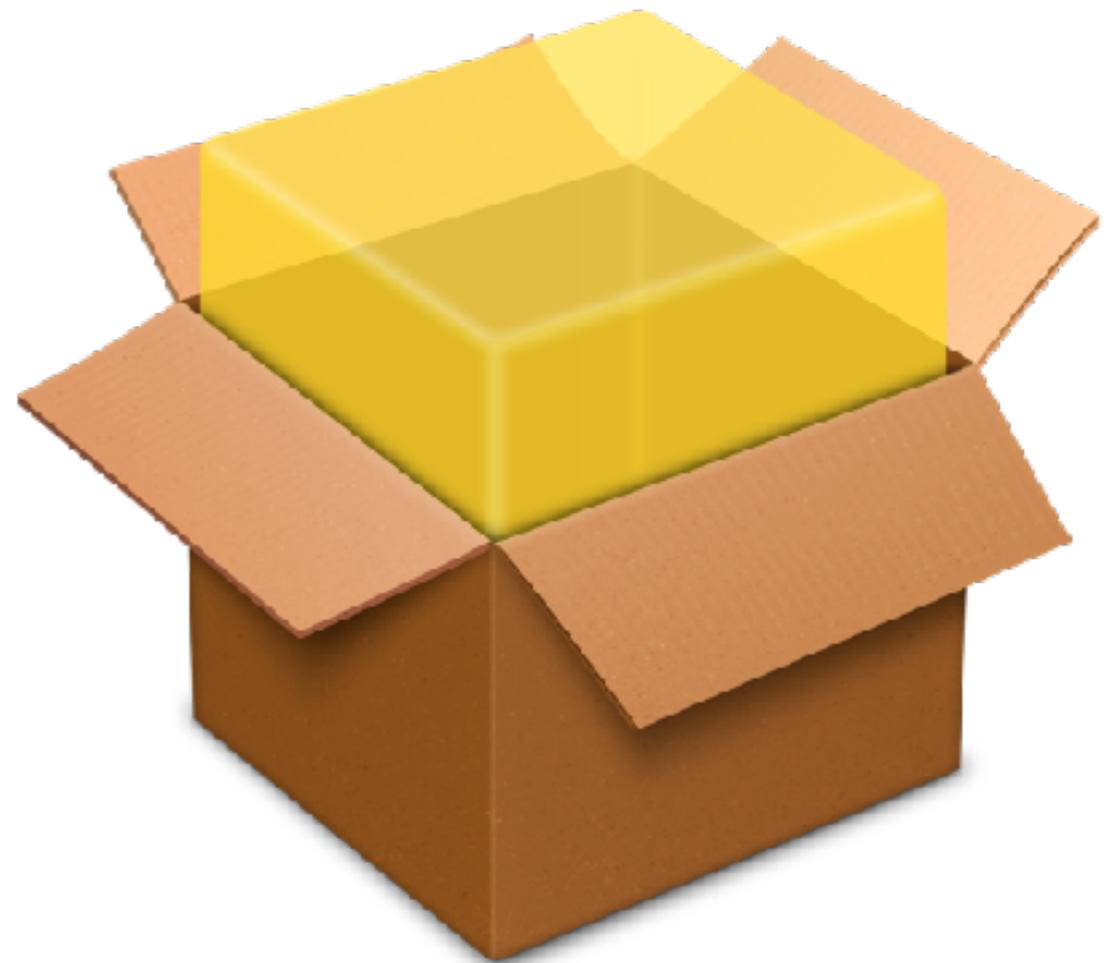
- Adobe
- MS Office
- Printer Drivers
- MATLAB
- AutoCad
- plug-ins
- Firefox, Chrome
- VMware + tools
- AnyConnect
- Xcode
- Garageband
- Logic
- Templates
- IBM SPSS
- CLI tools
- Python modules
- TeamViewer
- Fonts

# still require packages

- Adobe
- MS Office
- Printer Drivers
- MATLAB
- AutoCad
- plug-ins
- Firefox, Chrome
- VMware + tools
- AnyConnect
- Xcode
- Garageband
- Logic
- Templates
- IBM SPSS
- UNIX tools
- Python modules
- TeamViewer
- Fonts
- configuration
- BBEdit
- Github Desktop
- ARD config
- SSH config
- Flash Player
- Java and JDK
- Mathematica
- MacTeX
- X11 (Xquartz)
- Coda
- Dev tools
- JMP Pro
- admin tools

# still require packages

- Non Store Apps
- System Tools
- UNIX
- Hardware Drivers
- Configuration

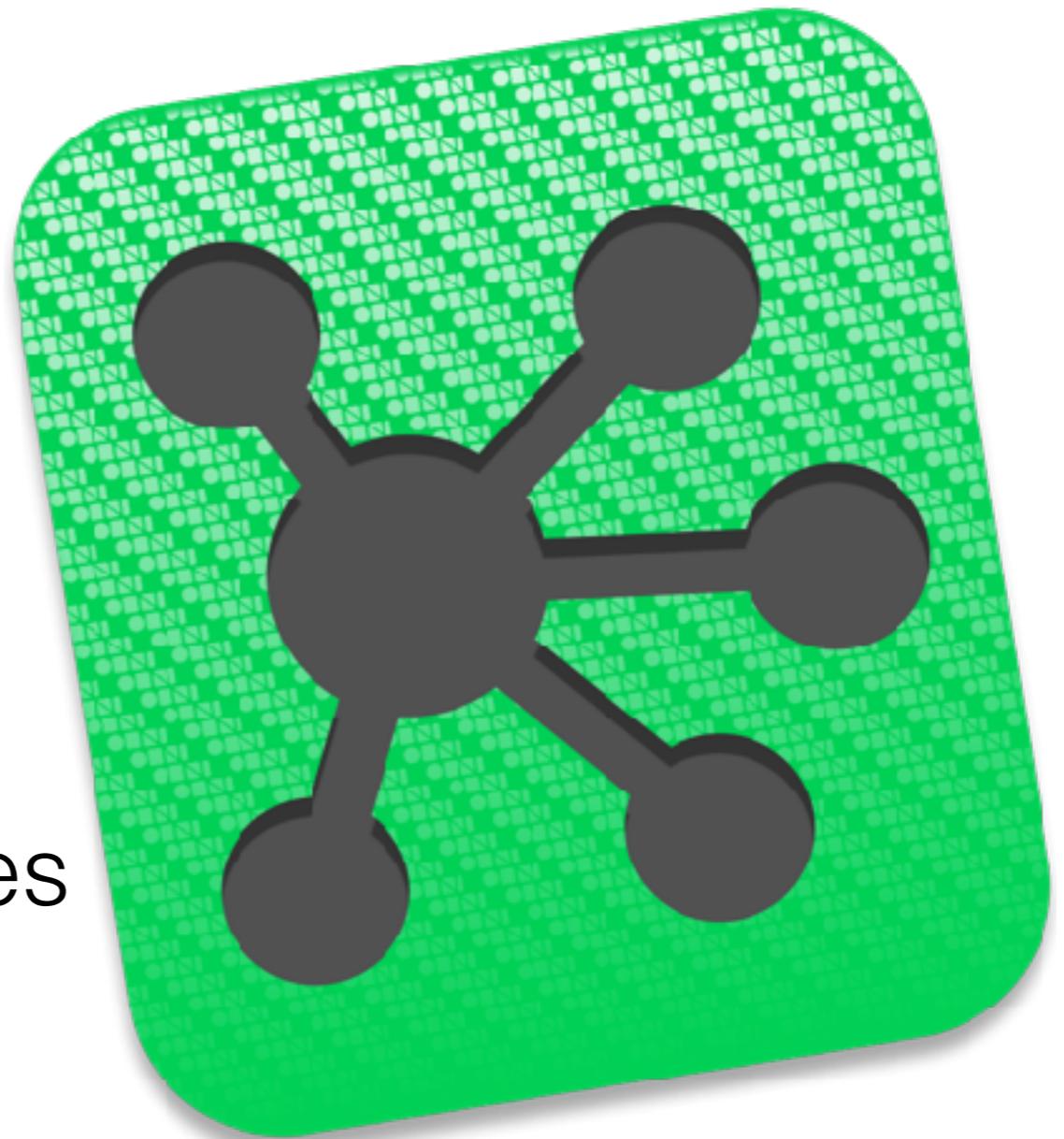


# Left Mac App Store

- PaintCode 3
- Sketch
- Piezo
- Veertu
- Coda
- BBEdit
- Alfred
- RapidWeaver

# OmniGroup

- Free — two week trial
- free document viewer
- In-App-Purchase
- different IAP for upgrades



# OmniGroup

- Deploy  
In-App-Purchase?
- Volume  
In-App-Purchase?



# Xcode

deployment for  
non-admin users  
requires postinstall  
script



# MDM only future

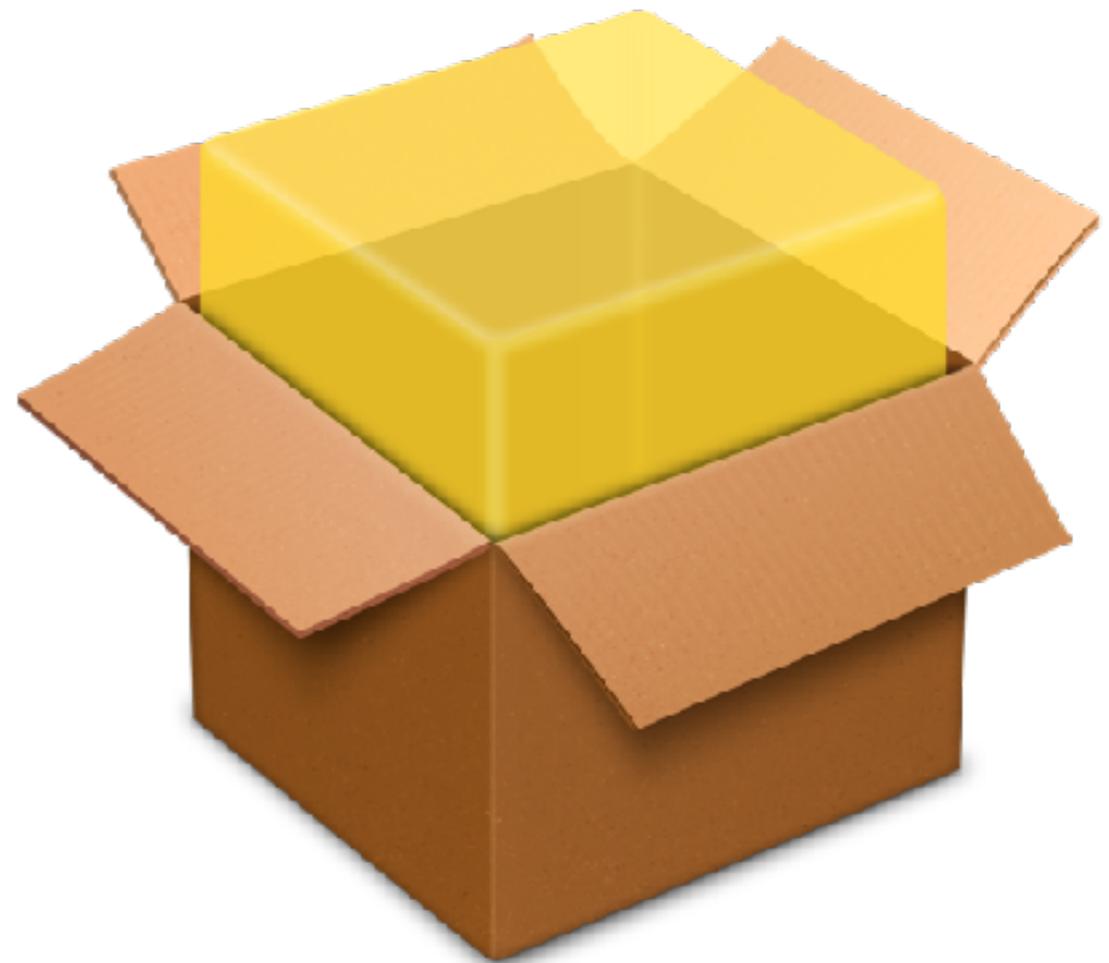
- many questions remain
- MDM can install agent pkg
- file bugs with Apple and vendors
- talk with your Apple Representative



# Installation Packages

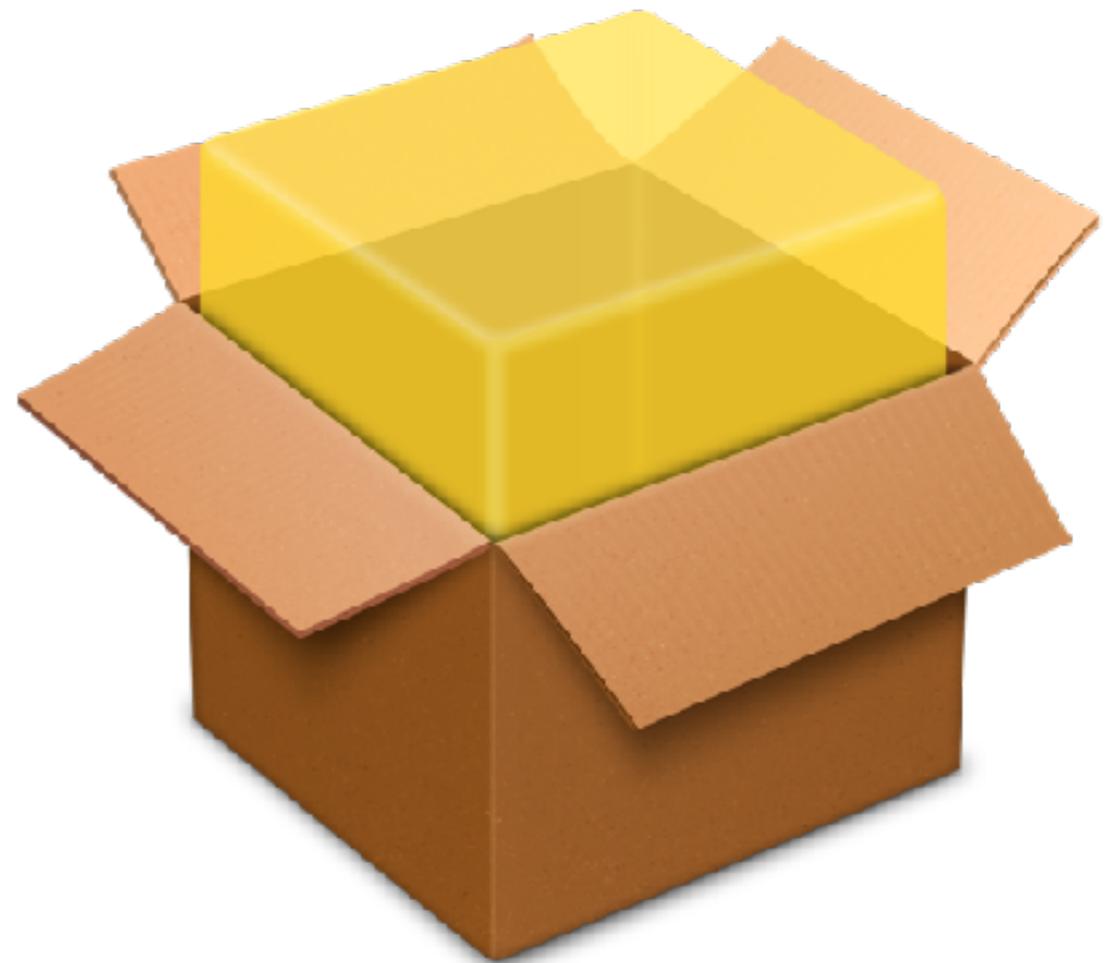
# Packages — Anatomy

- payload
  - files
  - metadata: privileges, owner
- scripts
  - preinstall
  - postinstall



# Distribution Packages

- multiple component pkgs
- system and hardware requirements
- custom interface
  - License, ReadMe
- required for System Install
  - createOSXInstallPkg
  - AutoDMG
  - NetInstall



# pkgbuild & productbuild

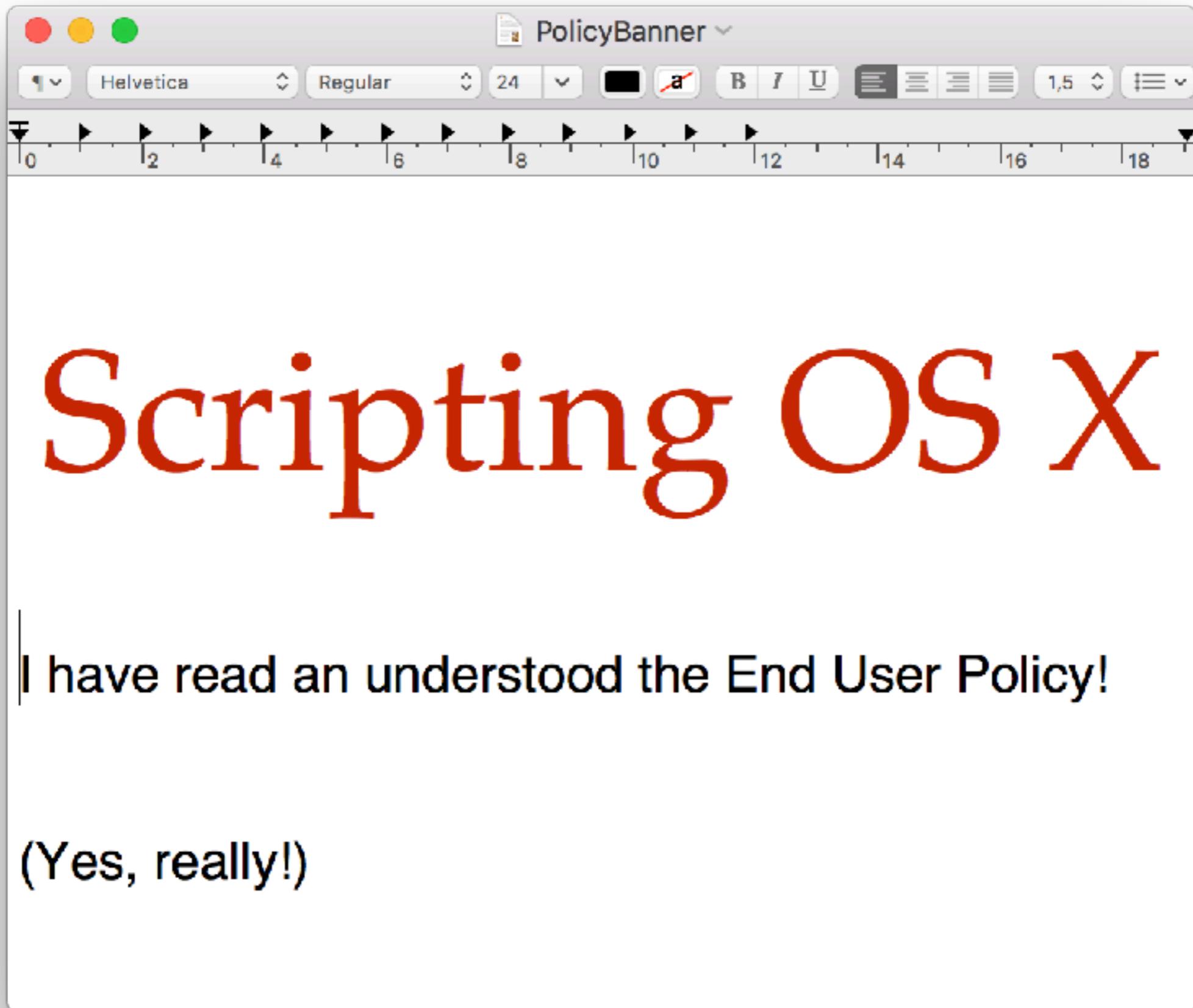
- CLI only
- flat packages
- component and distribution style

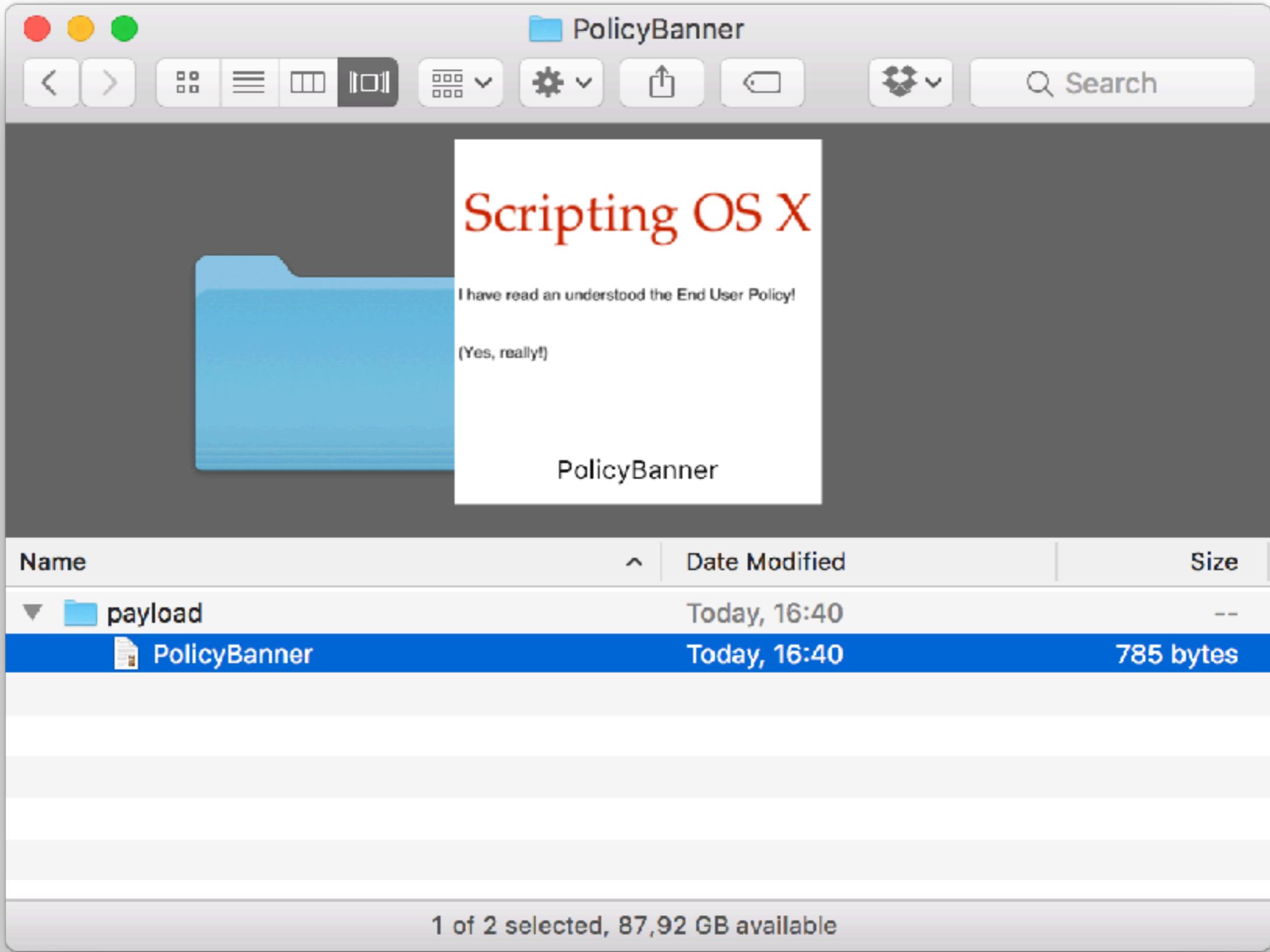
# pkgbuild — build from app

```
$ pkgbuild --component /Applications/Numbers.app/ Numbers.pkg  
pkgbuild: Adding component at /Applications/Numbers.app/  
pkgbuild: Inferred install-location of /Applications  
pkgbuild: Wrote package to Numbers.pkg
```

# pkgutil — show PackageInfo

```
$ pkgutil --expand Numbers.pkg ./Numbers_expanded
$ cat Numbers_expanded/PackageInfo
<?xml version="1.0" encoding="utf-8"?>
<pkg-info overwrite-permissions="true" relocatable="false"
identifier="com.apple.iWork.Numbers" postinstall-action="none"
version="4.0.5" format-version="2" generator-
version="InstallCmds-609 (16C67)" install-location="/
Applications" auth="root">
```





# Scripting OS X

I have read an understood the End User Policy!

(Yes, really!)

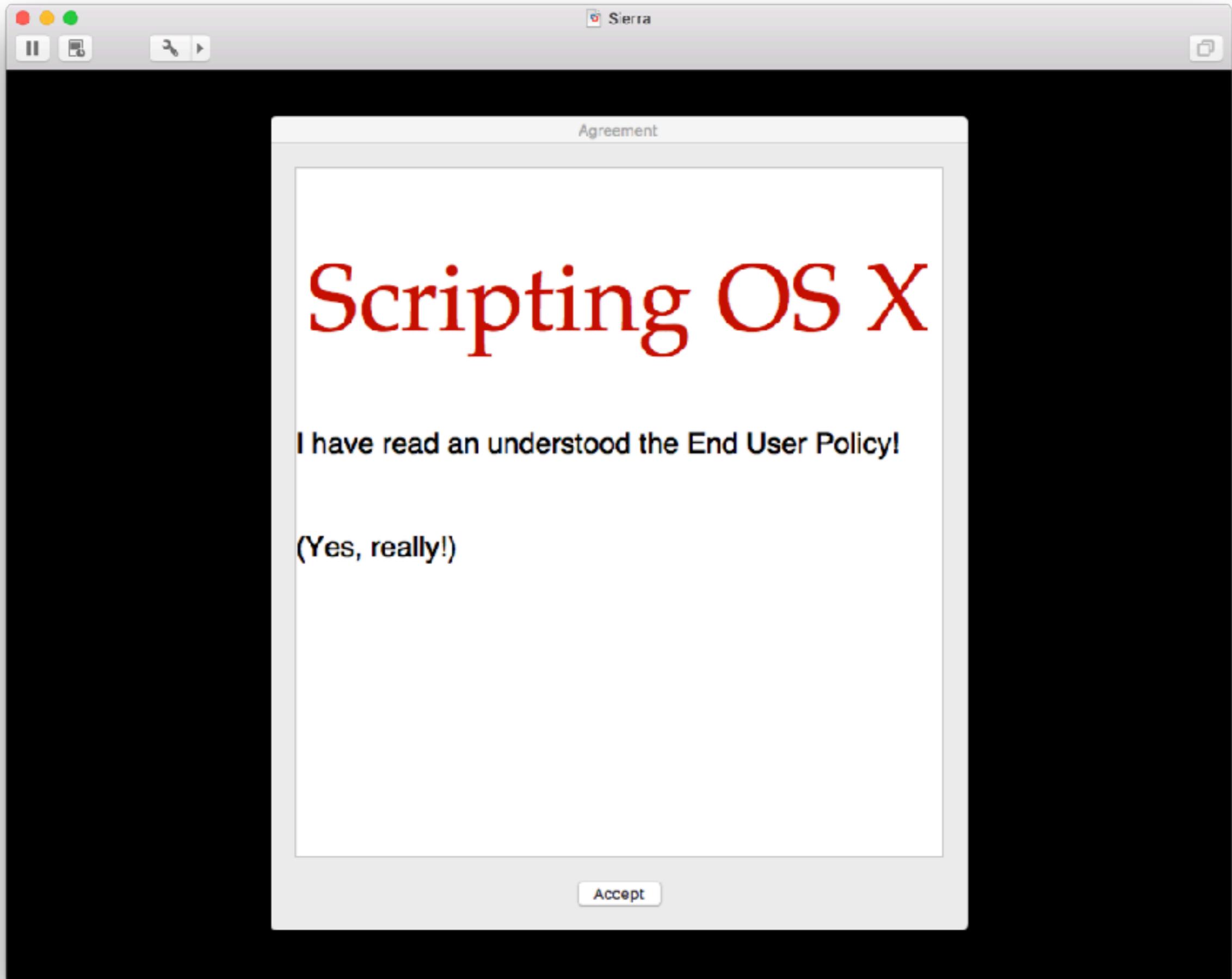
PolicyBanner

Name	Date Modified	Size
▼ payload	Today, 16:40	--
PolicyBanner	Today, 16:40	785 bytes

1 of 2 selected, 87,92 GB available

# pkgbuild — custom build

```
$ cd ~/Projects/PolicyBanner  
$ pkgbuild --root payload \  
--identifier com.scriptingosx.PolicyBanner \  
--version 1.0 \  
--install-location /Library/Security \  
PolicyBanner-1.0.pkg
```



# Scripting OS X

I have read an understood the End User Policy!

(Yes, really!)

Accept

# pkgbuild — build from dmg

```
$ hdiutil attach ~/Downloads/Firefox\ 50.1.0.dmg
```

```
$ pkgbuild --component /Volumes/Firefox/Firefox.app \  
           --install-location /Applications \  
           Firefox-50.1.0.pkg
```

```
$ hdiutil detach /Volumes/Firefox/
```



# Other Packaging Tools

# Whitebox Packages

- Powerful UI editor
- Distribution Package UI
- Installer JS



# Jamf Composer

- Casper Suite/Jamf Pro
- capture files from disk
  - compare before/after install
- composer files on JamfNation





New



Build as DMG



Build as PKG

Search

Search

SOURCE

PACKAGE

### Choose a method to create your package:

**Monitoring Installation**

Snapshot

**Operating System**

Build OS Package

**Package Manifests**

▶ Pre-Installed Software  
User Environment



Normal Snapshot



New & Modified  
Snapshot



Monitor File  
System Changes



Take a snapshot that watches for any new files on the boot drive. A snapshot will be taken before and after the installation process, and then the two snapshots will be compared.

Cancel

Previous

Next



New



Build as DMG



Build as PKG

Search

Search

SOU

PACI

### Choose a method to create your package:

**Monitoring Installation**

Snapshot

**Operating System**

Build OS Package

**Package Manifests**

▶ **Pre-Installed Software**

User Environment



Adobe Flash Player



Shockwave



Apple Remote Desktop 3



BBEdit



CrashPlan



Dropbox



Lotus Notes



Skype



This is a package manifest for Adobe Flash Player. This package manifest was tested with Adobe Flash Player 10.0.45.2 on Mac OS X 10.6.3 on 5/19/2010.

**Created By** JAMF Software, LLC



Cancel

Previous

Next

# munki-pkg

- wrapper script for pkgbuild
- most options in BuildInfo.plist
- improved git interaction

# quickpkg

- packages applications from disk, dmg, zip archives

```
quickpkg /Applications/Numbers.app
```

```
quickpkg ~/Downloads/Firefox\ 50.1.0.dmg
```

# The Luggage

- wrapper for packagemaker/pkgbuild
- modeled after make
- for version control

# CharlesSoft Pacifist

- shows package contents
- de-archives individual files and scripts
- QuickLook Plug-in





Install



Extract To...



Verify



Show Info



View Files

Search

Find

Package is a metapackage

Package requests authentication

Package has a valid signature: Developer ID Installer: Microsoft Corporation (UBF8T346G9) (Developer ID Certification Authority, Apple Root CA)

Size: 14,0 MiB compressed, 34,8 MiB uncompressed

Size of selected files: 0 bytes

Contents

Resources

Filename	Size	Owner	Group	Permissions	Modification Date	Ver...
▼ Contents of silverlight.pkg	34,7 MiB	root	wheel	drwxr-xr-x		
▼ Contents of silverlight_plugin.pkg	34,7 MiB	root	wheel	drwxr-xr-x		
▼ Library	34,6 MiB	root	wheel	drwxr-xr-x		
▼ Application Support	484,0 KiB	root	wheel	drwxr-xr-x		
▼ Microsoft	484,0 KiB	root	wheel	drwxr-xr-x		
▼ Silverlight	484,0 KiB	root	wheel	drwxr-xr-x		
▶ OutOfBrowser	484,0 KiB	root	wheel	drwxr-xr-x		
version.txt	12 bytes	root	wheel	-r--r--r--	12/07/16 07:06	
▼ Internet Plug-Ins	34,1 MiB	root	wheel	drwxr-xr-x		
▶ Silverlight.plugin	34,1 MiB	root	wheel	drwxr-xr-x		
▼ tmp	83,4 KiB	root	wheel	drwxr-xr-x		
▼ SilverlightInstallTools	83,4 KiB	root	wheel	drwxr-xr-x		
PlayReadyGetIBXVersionTool	14,8 KiB	root	wheel	-rwxr-xr-x	12/07/16 08:20	
pkmkshellutility	54,3 KiB	root	wheel	-r-xr-xr-x	12/07/16 08:20	
rundylib	14,3 KiB	root	wheel	-rwxr-xr-x	12/07/16 08:20	



Install



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Size: 14,0 MiB compressed, 34,8 MiB uncompressed

Size of selected files: 0 bytes

Contents

Resources

Filename	Size	Owner	Group	Permissions	Modification Date	Ver...
▼ silverlight.pkg	14,7 MiB	armin	staff	drwxr-xr-x	16/08/16 22:39	
Distribution	2,4 KiB	root	wheel	-rw-r--r--		
▶ Resources	721,8 KiB	root	wheel	drwx-----	01/01/70 01:00	
▼ silverlight_plugin.pkg	13,9 MiB	root	wheel	drwx-----	01/01/70 01:00	
Bom	147,0 KiB	armin	staff	-rw-r--r--	12/07/16 08:20	
PackageInfo	2,3 KiB	root	wheel	-rw-r--r--		
Payload	13,8 MiB	armin	staff	-rw-r--r--	12/07/16 08:20	
▼ Scripts	1,7 KiB	armin	staff	-rwxr-xr-x	12/07/16 08:20	
postinstall	6,1 KiB	armin	admin	-r-xr-xr-x	08/07/16 09:03	
preinstall	396 bytes	armin	admin	-r-xr-xr-x	08/07/16 09:03	

```
#!/bin/sh

# Postflight shell script.
# Copyright (c) 2006 Microsoft Corporation

#####
# Remove WPFfe

echo "Postflight: Hello"

pushd /Library/Internet\ Plug-Ins/
rm -rf WPFfe.plugin/
chown -R root:admin Silverlight.plugin/
chmod -R 775 Silverlight.plugin/
popd

pushd /Library/Application\ Support/Microsoft/
chown -R root:admin Silverlight/
chmod -R 775 Silverlight/
popd

pushd /Library/Application\ Support/
chown root:admin Microsoft/
chmod 775 Microsoft/
popd

echo "Postflight: After Chmods"
echo "Postflight: PackagePath =" $PACKAGE_PATH
# System.Windows.dll code uses '[DllImport("agcore")]', which assumes that agcore will be in the same
# folder. Fake it with a symlink. The alternative would be to change the DllImport but then we would
# need to make System.Windows.dll different between Mac and Windows.
pushd /Library/Internet\ Plug-Ins/Silverlight.plugin/Contents/MacOS/CoreCLR.bundle/Contents/MacOS/i386
rm -f agcore
ln -s ../../../../../../agcore
popd

if [ -d /Library/Internet\ Plug-Ins/Silverlight.plugin/Contents/MacOS/CoreCLR.bundle/Contents/MacOS/
x86_64 ]
then
    pushd /Library/Internet\ Plug-Ins/Silverlight.plugin/Contents/MacOS/CoreCLR.bundle/Contents/MacOS/
x86_64
    rm -f agcore
    ln -s ../../../../../../agcore
    popd
fi

echo "Postflight: After Symlink"

#if a playready state exists and the version of the ibx is the beta version, remove the entire playready
```

# CharlesSoft Pacifist

```
$ open -a "Pacifist" installer.pkg
```

```
alias pacifist='open -a "Pacifist"'
```

# Suspicious Package

- shows package contents
- export individual files
- package review





Back



Path



Action



Get Info



Installer

Search

Search



Exports

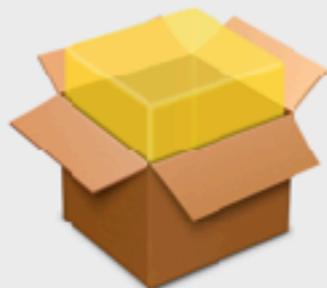


Review

**Package Info**

All Files

preinstall



## silverlight.pkg

Developer ID Installer Package ?

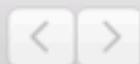
Installs 551 items — 36,3 MB on disk →

**DEVELOPER ID** Signed by "Developer ID Installer: Microsoft Corporation (UBF8T346G9)" →

Runs 2 install scripts →

Downloaded by Safari — today at 11:29 →

Didn't find any issues for review



Back



Path



Action



Get Info



Installer

Search

Search



Exports



Review

Package Info

All Files

preinstall

Name	Date Modified	Size	Kind
Library	--	36,3 MB	Folder
Application Support	--	496 KB	Folder
Microsoft	--	496 KB	Folder
Silverlight	--	496 KB	Folder
OutOfBrowser	--	496 KB	Folder
SLLauncher.app	--	496 KB	Application
version.txt	12/07/16 07:06	12 bytes	Text
Internet Plug-Ins	--	35,8 MB	Folder
Silverlight.plugin	--	35,8 MB	Plug-In
tmp	--	85 KB	Folder
SilverlightInstallTools	--	85 KB	Folder
pkmshellutility	12/07/16 08:20	56 KB	Executable
PlayReadyGetIBXVersionTool	12/07/16 08:20	15 KB	Executable
rundylib	12/07/16 08:20	15 KB	Executable



Name --

Kind --

Size --

Modified --

Owner --

Group --

Permissions

User	--
Group	--
Everyo...	--

Version --

Identifier --

All Files



Search



Back

Path

Action

Get Info

Installer

Search

Exports

Review

Package Info

All Files

preinstall

silverlight\_plugin.pkg

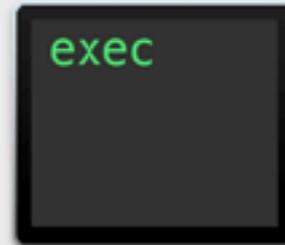
preinstall

postinstall

```

1  #!/bin/sh
2
3  # Script to delete old versions
4  # Copyright (c) 2006 Microsoft Corporation
5
6  #####
7  # Remove WPF
8  rm -rf /Library/Internet\ Plug-Ins/WPF.plugin/
9  rm -rf /Library/Internet\ Plug-Ins/Silverlight.plugin/
10
11 rm -rf /Library/Receipts/Silverlight.pkg/
12 rm -rf /Library/Receipts/Silverlight_W2.pkg/
13 rm -rf /Library/Receipts/Silverlight_W2_MIX.pkg/

```



Name preinstall  
 Kind Shell script  
 Size 396 bytes — 13 lines  
 Where silverlight.pkg/  
 silverlight\_plugin.pkg/Scripts/  
 preinstall  
 As User root  
 When Before moving files into place

Arguments	
\$0	path to this script
\$1	path to this package
\$2	path to root of selected install disk
\$3	path to root of selected install disk
\$4	"/" on startup disk



# Packaging Strategies

# Packaging Strategies

- MDM + VPP
- vendor installer
  - wrap in pkg
- package from dmg/archive
- track changes and capture files
- reverse engineer installation



**Automated Packaging**

# pkgbuild — build from dmg

```
$ hdiutil attach ~/Downloads/Firefox\ 50.1.0.dmg
```

```
$ pkgbuild --component /Volumes/Firefox/Firefox.app \  
           --install-location /Applications \  
           Firefox-50.1.0.pkg
```

```
$ hdiutil detach /Volumes/Firefox/
```

# Firefox — Update 2016

- 7 major
- 14 minor



# Common workflow

- Learn about update
- Download (dmg, rpm, zip etc.)
- (Re-)Package
- Upload to management system
- Configure for test deployment

# autopkg

- Open Source Python tool
- Community workflows (recipes)
- extensible
- many management systems
  - Jamf Pro, Munki, FileWave, Absolute Manage, DeployStudio, LanRev, MacPatch etc.

# autopkg workflow

- Find Recipe: `autopkg search`
- test and configure
- run `autopkg`

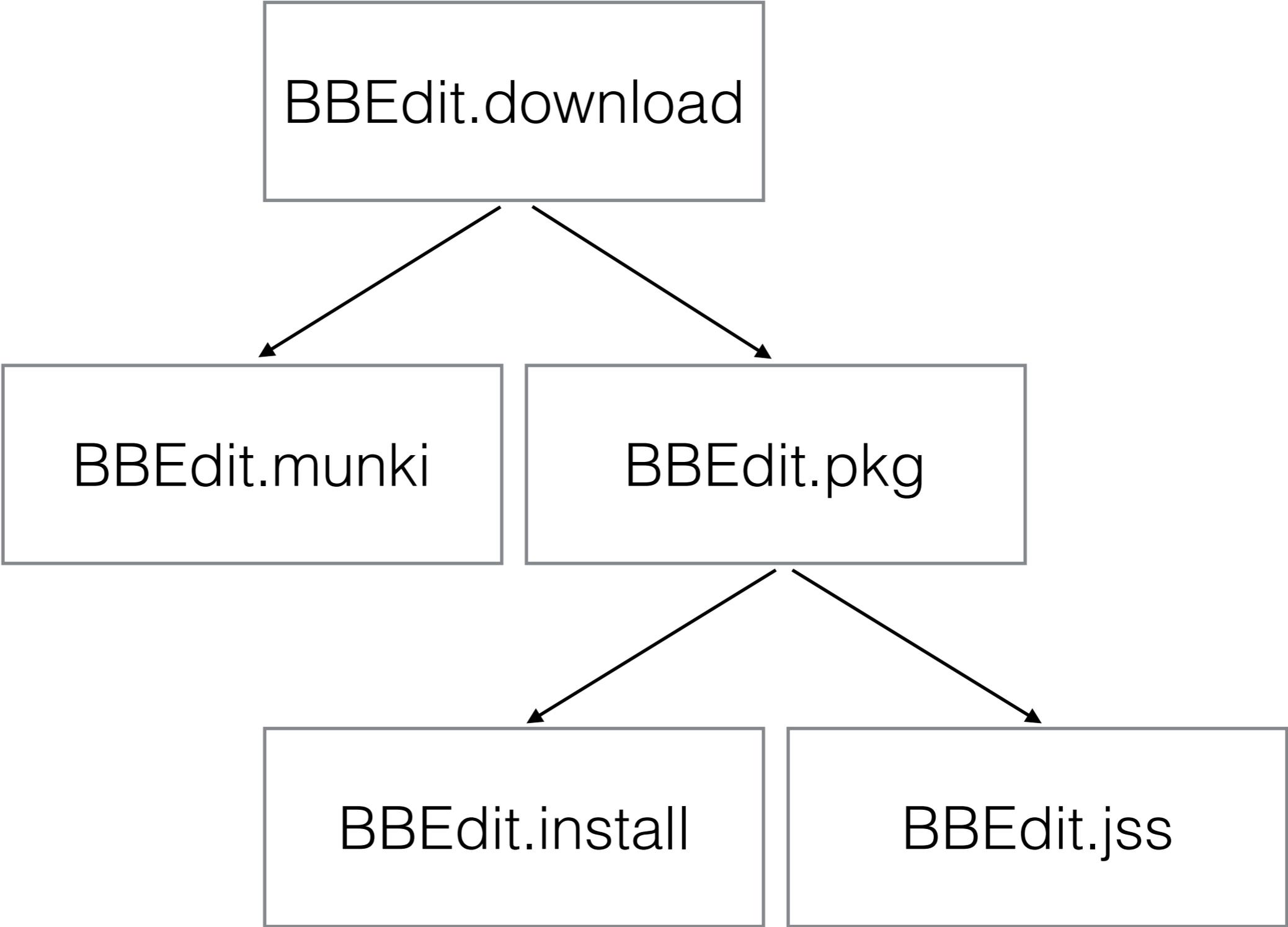
# autopkg — Find Recipe

```
$ autopkg search BBEdit
```

Name	Repo	Path
-----	-----	-----
BBEdit.jss.recipe	jss-recipes	BBEdit/BBEdit.jss.recipe
BBEdit.install.recipe	recipes	Barebones/BBEdit.install.recipe
BBEdit.pkg.recipe	recipes	Barebones/BBEdit.pkg.recipe
BBEdit.munki.recipe	recipes	Barebones/BBEdit.munki.recipe
BBEdit.download.recipe	recipes	Barebones/BBEdit.download.recipe
TextWrangler.munki.recipe	recipes	Barebones/TextWrangler.munki.recipe
BBEdit.install.recipe	rtrouton-recipes	Barebones/BBEdit.install.recipe
BBEdit.pkg.recipe	rtrouton-recipes	Barebones/BBEdit.pkg.recipe

To add a new recipe repo, use 'autopkg repo-add <repo name>'

```
$ autopkg repo-add recipes
```



# autopkg — Test

```
$ autopkg info BBEdit.munki
```

```
Description:      Downloads the current installation package for BBEdit. Imports it  
                  into Munki, adding a postinstall_script that installs the command-line tools.  
Identifier:       local.munki.BBEdit  
Munki import recipe: True  
Has check phase: True  
Builds package:  False  
Recipe file path: ~/Library/AutoPkg/RecipeRepos/com.github.autopkg.recipes/Barebones/BBEdit.munki.recipe  
Parent recipe(s): ~/Library/AutoPkg/RecipeRepos/com.github.autopkg.recipes/Barebones/BBEdit.download.recipe
```

```
$ autopkg run -v BBEdit.download
```

```
$ autopkg run -v BBEdit.munki
```

# autopkg — Override

Key	Class	Value
▼ AutoPkg Recipe	AutoPkg Recipe	4 key/value pairs (Identifier = local.munki.BBEdit)
Identifier	String	local.munki.BBEdit
▼ Input	Input	3 key/value pairs
MUNKI_REPO_SUBDIR	String	apps/BBEdit
NAME	String	BBEdit
▼ pkginfo	Dictionary	8 key/value pairs
▼ catalogs	Array	1 ordered objects
0	String	testing
category	String	Text Editors
description	String	BBEdit is the leading p...with high performance.
developer	String	Barebones
display_name	String	BBEdit
name	String	%NAME%
postinstall_script	String	/bin/sh
unattended_install	Boolean	YES
ParentRecipe	String	com.github.autopkg.munki.bbedit
▶ ParentRecipeTrustInfo	Dictionary	2 key/value pairs

```
<?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>Identifier</key>
  <string>local.munki.BBEdit</string>
  <key>Input</key>
  <dict>
```

\$ autopkg make  
Override file

ki.recipe

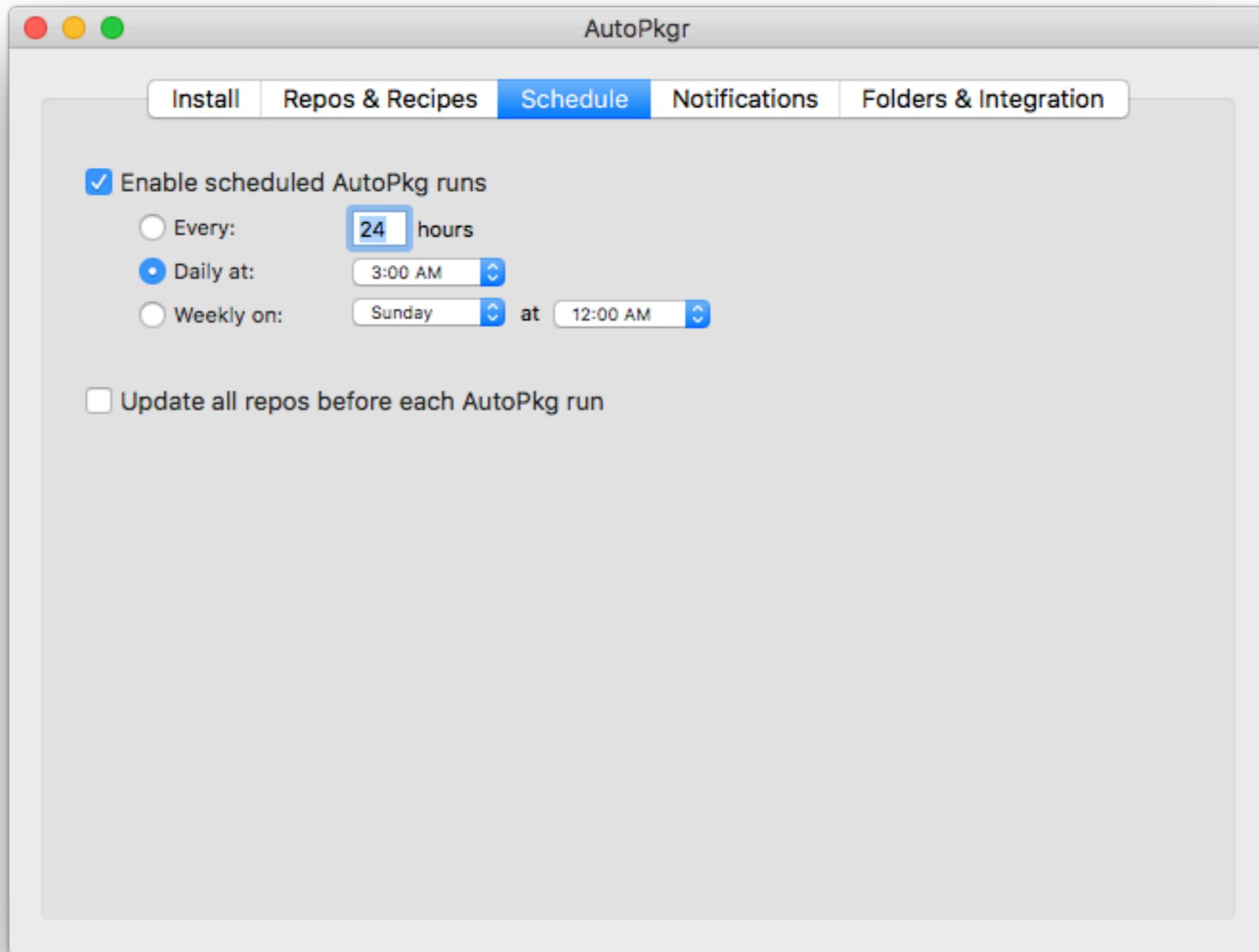
# autopkg — Run

```
$ autopkg run BBEdit.munki
```

```
$ autopkg run Firefox.munki GoogleChrome.munki
```

```
$ autopkg run -l recipe_list.txt
```

# AutoPkgr - Schedule



# AutoPkgr — Notification

The screenshot shows the 'AutoPkgr' application window with the 'Notifications' tab selected. The window contains several configuration options for email and other notification services.

**Notification Settings:**

- Send notifications to an email address Send Test Email
- From:
- Recipients:
- SMTP server:  port
- Use Secure Sockets Layer (SSL)
- Use authentication
- Username:  Password:

**Integration Settings:**

- Send notifications to Slack channel Configure...
- Send notifications to HipChat room Configure...
- Enable Mac OS X notifications

**Customization:**

- Choose which actions trigger notification: Customize...
- Customize notification templates: Customize...

# autopkg — Recipes

- more than 100 products
- several management systems
  - Jamf Pro, Munki, FileWave, Absolute Manage, DeployStudio, LanRev, MacPatch etc.
- more than 80 contributors

# autopkg — Recipes

Recipes create packages/scripts that  
run as root on all clients

# Transmission — KeRanger

- Download was replaced with a copy with Ransomware
- Bad copy was signed with a stolen developer certificate
- March *and* September 2016



# autopkg — Trust

```
WARNING: Firefox.pkg is missing  
trust info and  
FAIL_RECIPES_WITHOUT_TRUST_INFO  
is not set. Proceeding...
```

# autopkg — Trust

```
WARNING: Firefox.pkg is missing trust info and  
FAIL_RECIPES_WITHOUT_TRUST_INFO is not set. Proceeding...
```

- obligation to audit recipes
- mark recipe as trusted in override
- trust info warns when any parent recipe updates

# autopkg — audit

- non-secure download URLs
- missing code signature verification
- modifying and creating processors
- custom processors

# autopkg — audit

```
$ autopkg audit BBEdition.munki
```

```
BBEdit.munki
```

```
File path:          ~/L/AutoPkg/RecipeRepos/autopkg_private_recipes/Overrides/BBEdit.munki.recipe
```

```
Parent recipe(s):  ~/L/AutoPkg/RecipeRepos/com.github.autopkg.recipes/Barebones/BBEdit.munki.recipe
```

```
~/L/AutoPkg/RecipeRepos/com.github.autopkg.recipes/Barebones/
```

```
BBEdit.download.recipe
```

```
The following processors are non-core and can execute arbitrary code, performing any action.
```

```
Be sure you understand what the processor does and/or you trust its source:
```

```
  BarebonesURLProvider
```

# autopkg — update trust

- initial `make-override` sets trust
- use `update-trust-info` after change
- set preference key  
`FAIL_RECIPES_WITHOUT_TRUST_INF`  
0 to fail untrusted recipes

# Packaging

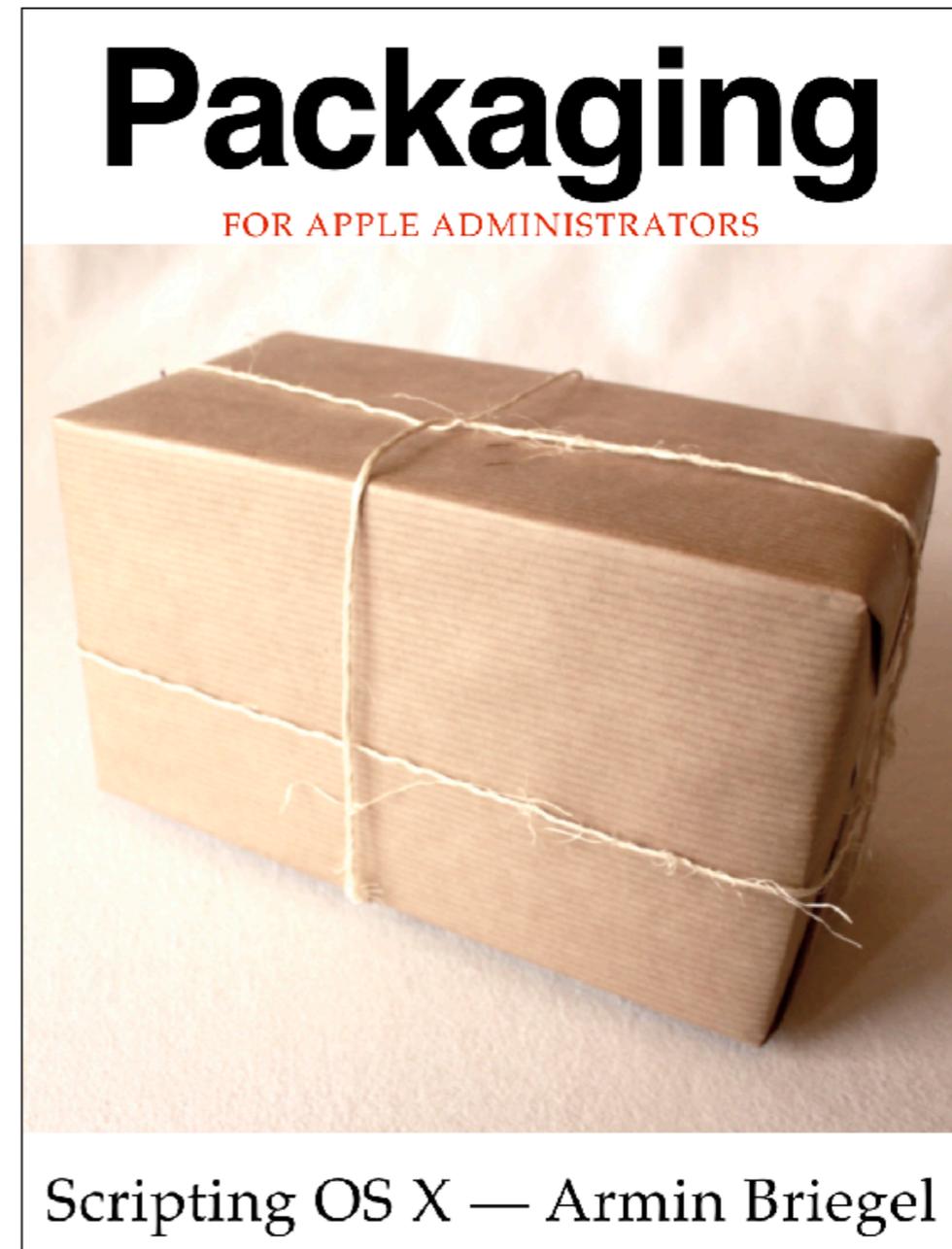
FOR APPLE ADMINISTRATORS



Scripting OS X — Armin Briegel

# Packaging for Apple Administrators

- Installing
- Inspecting
- Building
  - Application
  - Configuration
- Strategies
- Third Party Tools



# Automated Packaging

FOR APPLE ADMINISTRATORS



**Coming Soon!**

Scripting OS X — Armin Briegel

[scriptingosx.com/books](http://scriptingosx.com/books)



# Scripting OS X

Armin Briegel

*Mac Admin, Consultant and Author*

# Armin Briegel

*Mac Admin, Consultant and Author*



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scriptingosx