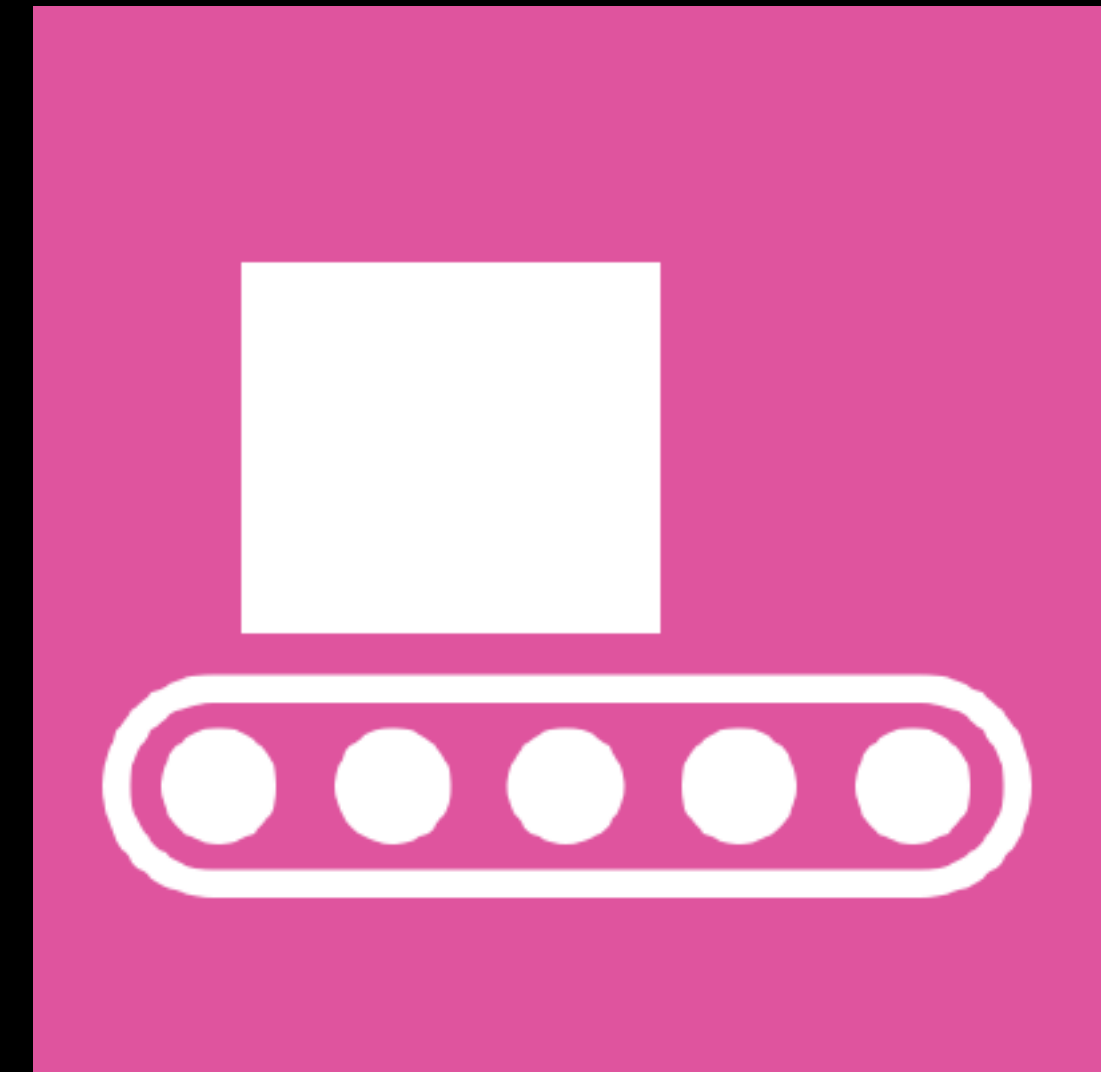


Next Level AutoPkg

X World 2024



James Smith

Commonwealth Bank of
Australia

 *smithjw*

 *smithjw*

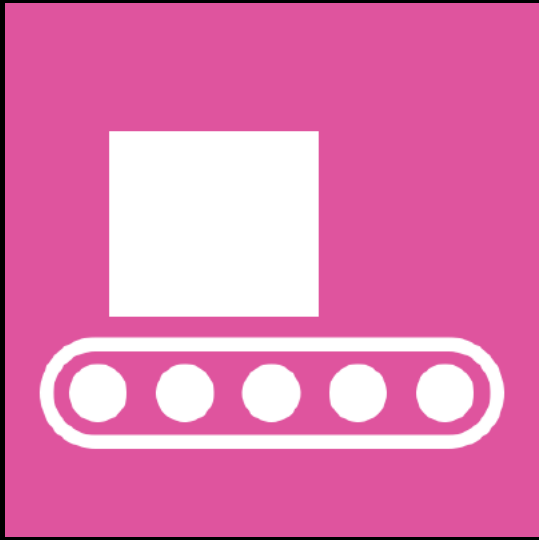
Anthony Reimer

University of Calgary

 *@AnthonyReimer@mastodon.social*

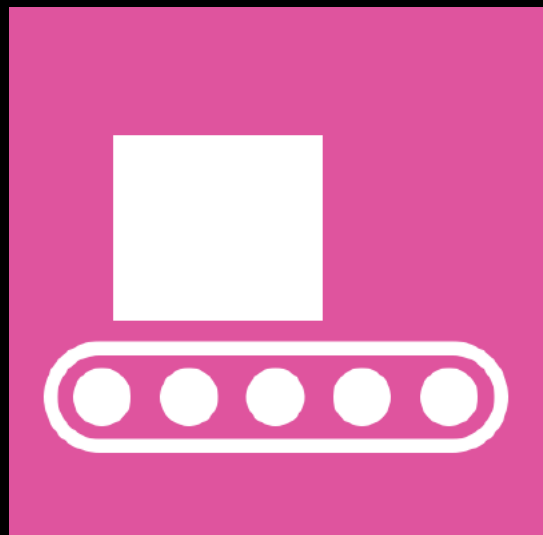
 *jazzace*

 *jazzace*



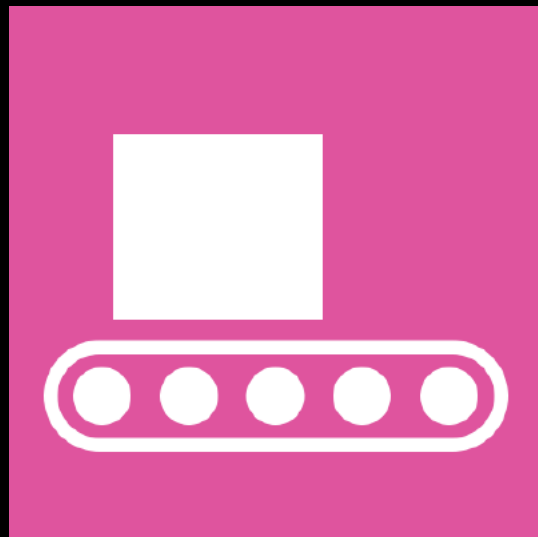
Install AutoPkg

- Requires AutoPkg, Python3, Git
 - ▶ *github.com/autopkg/autopkg/releases*
 - ▶ *Xcode Command Line Tools:*
developer.apple.com/download/
- Automated installation:
 - ▶ *AutoPkgSetup – Graham Pugh*
github.com/grahampugh/AutoPkgSetup
 - ▶ *AutoPkg*



Text Editor





Repos We Will Use

`autopkg repo-add`

- ▶ `recipes`
- ▶ `smithjw-recipes`
- ▶ `jazzace-recipes`
- ▶ `homebysix-recipes`
- ▶ `grahampugh-recipes`
- ▶ `rtrouton-recipes`

Reading Recipes

Self Saucing Fudge Dessert

When Joan serves this to company, she puts a scoop of ice cream on the pudding base before topping it with the sauce.

Pudding Base

1 cup	flour	250 mL
2 tsp.	baking powder	10 mL
¼ tsp.	salt	1 mL
½ cup	sugar	125 mL
3 tbsp.	cocoa	50 mL
½ cup	chopped nuts	125 mL
½ cup	milk	125 mL
1 tsp.	vanilla	5 mL
2 tbsp.	melted butter or margarine	25 mL

Sauce

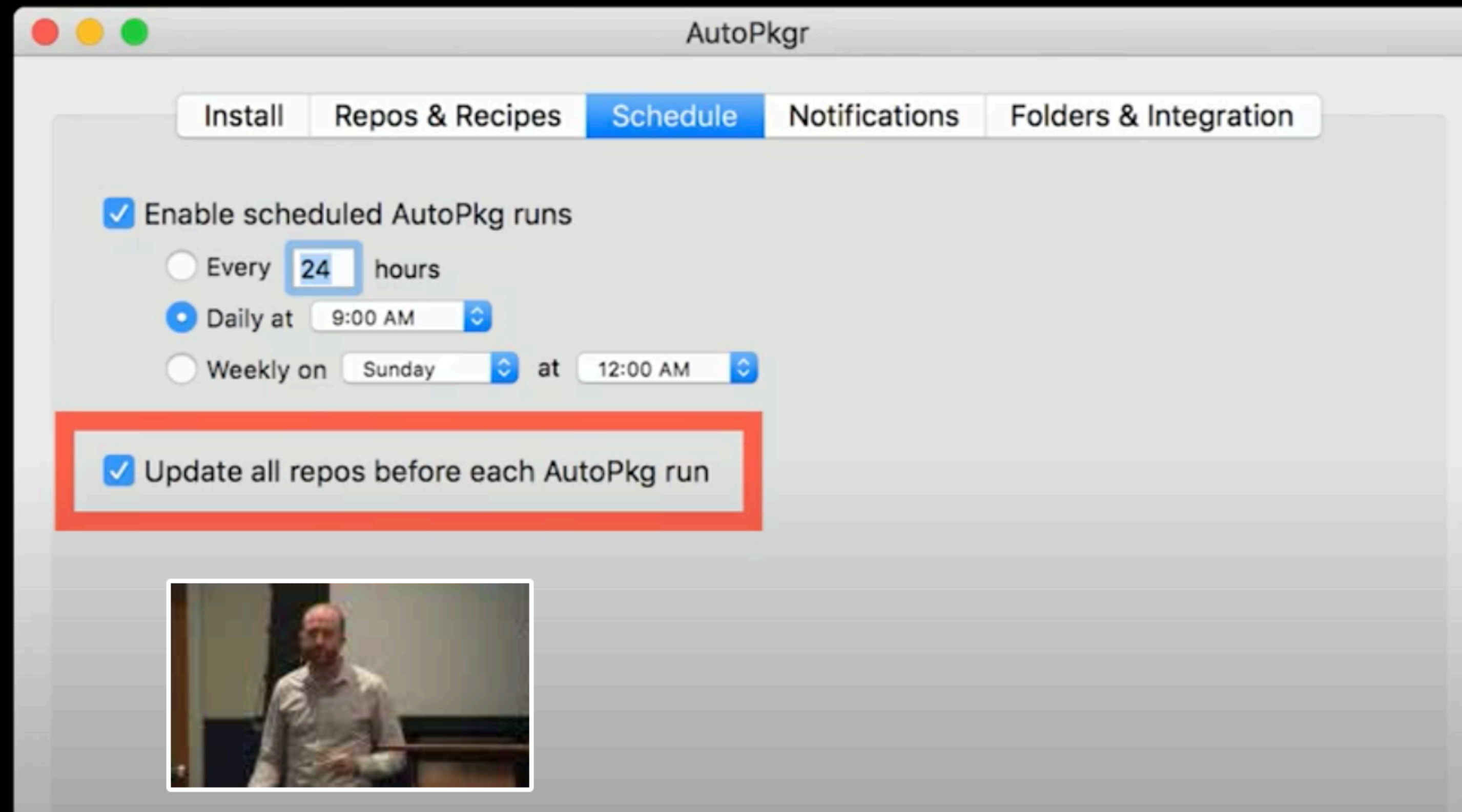
4 tbsp.	cocoa	65 mL
½ cup	sugar	125 mL
2 cups	hot water	500 mL

Sift into a two quart (litre) casserole, flour, baking powder, salt, ½ cup (125 mL) of sugar and 3 tablespoons (50 mL) of cocoa. Stir in the nuts. Make a well in the centre and add milk, vanilla and melted butter. Stir lightly and smooth evenly over bottom of the casserole.

Mix ½ cup (125 mL) of sugar and 4 tablespoons (65 mL) of cocoa. Sprinkle mixture over pudding base. Pour hot water over cocoa sugar mixture. Bake at 350°F (180°C) for 30 minutes. The batter rises and a rich sauce forms under it. Serve hot.



#7: Trust Without Verification



How (Not) To Do Bad Things With AutoPkg – Elliot Jordan
<https://youtube.com/watch?v=LnvQmLcDF8w>

Description: [Censored]
Identifier: com.github.smithjw.download.Docker
MinimumVersion: '2.3'

Input:

NAME: Docker
ARCHITECTURE: x86_64
DOWNLOAD_TYPE: amd64

Process:

- Processor: URLTextSearcher
Arguments:
 - re_pattern: ((\w+):\./\./(\S*)(%DOWNLOAD_TYPE%)(\S*)(dmg)(?=\?))
 - result_output_var_name: match
 - url: https://www.docker.com/get-started
- Processor: URLDownloader
Arguments:
 - filename: '%NAME%-%ARCHITECTURE%.dmg'
 - url: '%match%'
- Processor: EndOfCheckPhase
- Processor: AppDmgVersioner
Arguments:
 - dmg_path: '%pathname%'
- Processor: CodeSignatureVerifier
Arguments:
 - input_path: '%pathname%/%app_name%'
 - requirement: |
 - anchor apple generic and identifier "com.docker.docker" and (certificate
 - leaf[field.1.2.840.113635.100.6.1.9] /* exists */ or certificate 1[field.1.2.840.113635.100.6.2.6]
 - /* exists */ and certificate leaf[field.1.2.840.113635.100.6.1.13] /* exists
 - */ and certificate leaf[subject.OU] = "9BNSXJN65R")
 - deep_verification: true
 - strict_verification: true

smithjw



Docker.download.recipe.yaml

smithjw-recipes



Key	Value/Processors
Description	"Downloads the latest version of Docker" w/comment
Identifier	com.github.smithjw.download.Docker
Input	NAME, ARCHITECTURE, DOWNLOAD_TYPE
Minimum Version	2.3
Process	URLTextSearcher URLDownloader EndOfCheckPhase AppDmgVersioner CodeSignatureVerifier

jazzace



```
<key>Identifier</key>
<string>com.github.jazzace.download.MacadminsPython</string>
<key>Input</key>
<dict>
  <key>INCLUDE_PRERELEASES</key>
  <string>True</string>
  <key>NAME</key>
  <string>MacadminsPython</string>
</dict>
<key>MinimumVersion</key>
<string>1.0</string>
<key>Process</key>
<array>
  <dict>
    <key>Processor</key>
    <string>GitHubReleasesInfoProvider</string>
    <key>Arguments</key>
    <dict>
      <key>asset_regex</key>
      <string>python_recommended_signed-[\d.]+\d+.pkg</string>
      <key>github_repo</key>
      <string>macadmins/python</string>
      <key>include_prereleases</key>
      <string>%INCLUDE_PRERELEASES%</string>
    </dict>
  </dict>
  <dict>
    <key>Processor</key>
    <string>URLDownloader</string>
  </dict>
  <dict>
    <key>Processor</key>
    <string>EndOfCheckPhase</string>
  </dict>
  <dict>
    <key>Processor</key>
    <string>CodeSignatureVerifier</string>
    <key>Arguments</key>
    <dict>
      <key>expected_authority_names</key>
      <array>
        <string>Developer ID Installer: Mac Admins Open Source (T4SK8ZXCXG)</string>
        <string>Developer ID Certification Authority</string>
        <string>Apple Root CA</string>
      </array>
      <key>input_path</key>
      <string>%pathname%</string>
    </dict>
  </dict>
</dict>
</array>
```

MacadminsPython.download.recipe

jazzace-recipes



Key	Value/Processors
Description	Downloads the most recent (pre-)release signed pkg installer of macadmins/python ("Recommended" build) from GitHub. (w/INCLUDE_PRERELEASES info)
Identifier	com.github.jazzace.download.MacadminsPython
Input	NAME, INCLUDE_PRERELEASES
Minimum Version	1.0
Process	GitHubReleasesInfoProvider URLDownloader EndOfCheckPhase CodeSignatureVerifier

```
Identifier: local.download.MacadminsPython
Input:
  INCLUDE_PRERELEASES: 'True'
  NAME: MacadminsPython
ParentRecipe: com.github.jazzace.download.MacadminsPython
ParentRecipeTrustInfo:
  non_core_processors: {}
  parent_recipes:
    com.github.jazzace.download.MacadminsPython:
      git_hash: fddf438618df648a8f3f82db1495aa69d463709f
      path: ~/Library/AutoPkg/RecipeRepos/com.github.autopkg.jazzace-recipes/
macadmins/MacadminsPython.download.recipe
      sha256_hash: 9cba96bd1b8109cf0e3e9901a0f1e01ec43c8ba449106fc5acd556044bdd1323
```

```
Identifier: local.download.MacadminsPython
Input:
  INCLUDE_PRERELEASES: 'True'
  NAME: MacadminsPython
ParentRecipe: com.github.jazzace.download.MacadminsPython
ParentRecipeTrustInfo:
  non_core_processors: {}
  parent_recipes:
    com.github.jazzace.download.MacadminsPython:
      git_hash: fddf438618df648a8f3f82db1495aa69d463709f
      path: ~/Library/AutoPkg/RecipeRepos/com.github.autopkg.jazzace-recipes/
macadmins/MacadminsPython.download.recipe
      sha256_hash: 9cba96bd1b8109cf0e3e9901a0f1e01ec43c8ba449106fc5acd556044bdd1323
```

```
% autopkg make-override MacadminsPython.download --format=yaml
```

MacadminsPython.download.recipe

(override)

Key	Value/Processors
Identifier	local.download.MacadminsPython
Input	NAME, INCLUDE_PRERELEASES
ParentRecipe	com.github.jazzace.download.MacadminsPython
ParentRecipeTrustInfo	<ul style="list-style-type: none">- non-core processors: none- parent_recipes: 1 (w/hash and path info)
Process	[not present]

```
[...]
<key>Identifier</key>
<string>com.github.autopkg.download.MSTeams2</string>
<key>MinimumVersion</key>
<string>1.4</string>
<key>Input</key>
<dict>
    <key>CHANNEL</key>
    <string>Production</string>
    <key>LOCALE_ID</key>
    <string>1033</string>
    <key>NAME</key>
    <string>MSTeams</string>
    <key>PRODUCT</key>
    <string>Teams2</string>
    <key>VERSION</key>
    <string>latest</string>
</dict>
<key>ParentRecipe</key>
<string>com.github.autopkg.download.MSOfficeMacProduct</string>
</dict>
</plist>
```

recipes



MSTeams2.download.recipe

recipes



Key	Value/Processors
Identifier	com.github.autopkg.download.MSTeams2
Input	CHANNEL, LOCALE_ID, NAME, PRODUCT, VERSION
ParentRecipe	com.github.autopkg.download.MSOfficeMacProduct
Process	[not present]

MSOfficeMacProduct.download.recipe

Key	Value/Processors
Input	CHANNEL, LOCALE_ID, NAME, PRODUCT, VERSION
Process	MSOfficeMacURLandUpdateInfoProvider (custom) URLDownloader EndOfCheckPhase CodeSignatureVerifier

MSTeams2.download.recipe

Key	Value/Processors
Identifier	com.github.autopkg.download.MSTeams2
Input	CHANNEL, LOCALE_ID, NAME, PRODUCT, VERSION
ParentRecipe	com.github.autopkg.download.MSOfficeMacProduct
Process	[not present]

Identifier: `com.github.smithjw.pkg.WebStorm`
ParentRecipe: `com.github.bnpl.autopkg.download.webstorm`
MinimumVersion: `'2.3'`

Input:

NAME: `WebStorm`
SOFTWARE_TITLE: `WebStorm`

Process:

– Processor: `AppPkgCreator`

Arguments:

pkg_path: `'%RECIPE_CACHE_DIR%/SOFTWARE_TITLE%-%version%.pkg'`

smithjw



% autopkg processor-info AppPkgCreator

Description: Calls autopkgserver to create a package from an application.

Input variables:

app_path:

required: False

description: Path to an application to be packaged. Can be on a disk image and globbed. If not set, defaults to %pathname%/*.app.

Typically %pathname% points to a disk image downloaded in a prior recipe step.

pkg_path:

required: False

description: The pathname for the pkg to be created. If not set, defaults to %RECIPE_CACHE_DIR%/app_name%-version%.pkg

bundleid:

required: False

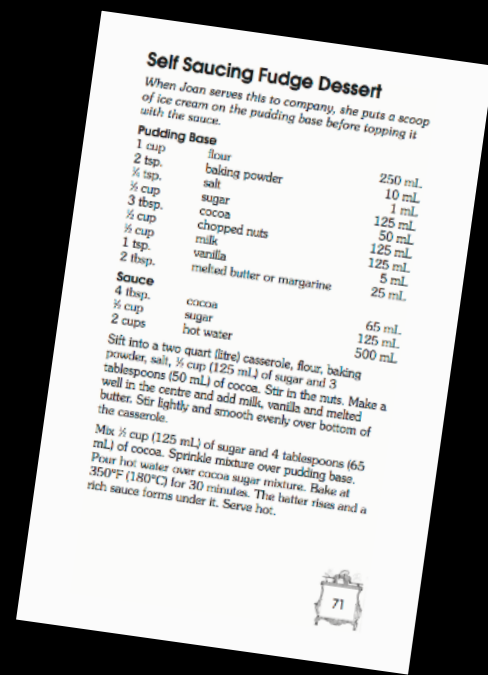
description: Bundle identifier of the app. If not set, will be extracted from the CFBundleIdentifier in the app's Info.plist.

version:

required: False

description: Version of the app. If not set, will be extracted from the CFBundleShortVersionString in the app's Info.plist.

[...]



Variables

Set via:

- the Input section of the recipe (ALL_CAPS by convention)
- the Arguments section of a Processor call
- output from a processor
- AutoPkg Preferences

Reference: github.com/autopkg/autopkg/wiki/Variables

```
Identifier: com.github.smithjw.pkg.WebStorm
ParentRecipe: com.github.bnpl.autopkg.download.webstorm
MinimumVersion: '2.3'
```

Input:

```
NAME: WebStorm
SOFTWARE_TITLE: WebStorm
```

Process:

```
- Processor: AppPkgCreator
```

Arguments:

```
pkg_path: '%RECIPE_CACHE_DIR%/SOFTWARE_TITLE-%version%.pkg'
```

Arguments section
of a Processor call

AutoPkg Preferences

Input Variable

Output from a processor

smithjw




```
[...]
<key>Identifier</key>
<string>com.github.jazzace.pkg.FCPContent</string>
<key>Input</key>
<dict>
    <key>ARTICLE_NUMBER</key>
    <string>106396</string>
    <key>NAME</key>
    <string>FCPContent</string>
</dict>
<key>MinimumVersion</key>
<string>2.0</string>
<key>ParentRecipe</key>
<string>com.github.jazzace.download.AppleSupportContent</string>
<key>Process</key>
<array>
    <dict>
        <key>Processor</key>
        <string>PkgCopier</string>
        <key>Arguments</key>
        <dict>
            <key>pkg_path</key>
            <string>%RECIPE_CACHE_DIR%/%%NAME%-%version%.pkg</string>
            <key>source_pkg</key>
            <string>%pathname%/*.pkg</string>
        </dict>
    </dict>
</array>
</dict>
</plist>
```

jazzace



FinalCutProContent.pkg.recipe

jazzace-recipes



Key	Value/Processors
Identifier	com.github.jazzace.download.MacadminsPython
Input	NAME, ARTICLE_NUMBER
ParentRecipe	com.github.jazzace.download.AppleSupportContent
Process	PkgCopier

Identifier: com.github.smithjw.pkg.zoom_it
ParentRecipe: com.github.smithjw.download.zoom_it
MinimumVersion: '2.3'

Input:
NAME: Zoom

Process:

- Processor: FlatPkgUnpacker
Arguments:
 - destination_path: '%RECIPE_CACHE_DIR%/expand'
 - flat_pkg_path: '%pathname%'
- Processor: PkgPayloadUnpacker
Arguments:
 - destination_path: '%RECIPE_CACHE_DIR%/unpack'
 - pkg_payload_path: '%RECIPE_CACHE_DIR%/expand/zoomus.pkg/Payload'
- Processor: Versioner
Arguments:
 - input_plist_path: '%RECIPE_CACHE_DIR%/unpack/zoom.us.app/Contents/Info.plist'
 - plist_version_key: CFBundleShortVersionString
- Processor: com.github.homebysix.VersionSplitter/VersionSplitter
- Processor: PkgCopier
Arguments:
 - pkg_path: '%RECIPE_CACHE_DIR%/NAME%-version%.pkg'
 - source_pkg: '%pathname%'
- Processor: com.github.smithjw.processors/FriendlyPathDeleter
Arguments:
 - fail_deleter_silently: True
 - path_list:
 - '%RECIPE_CACHE_DIR%/unpack'
 - '%RECIPE_CACHE_DIR%/expand'

smithjw

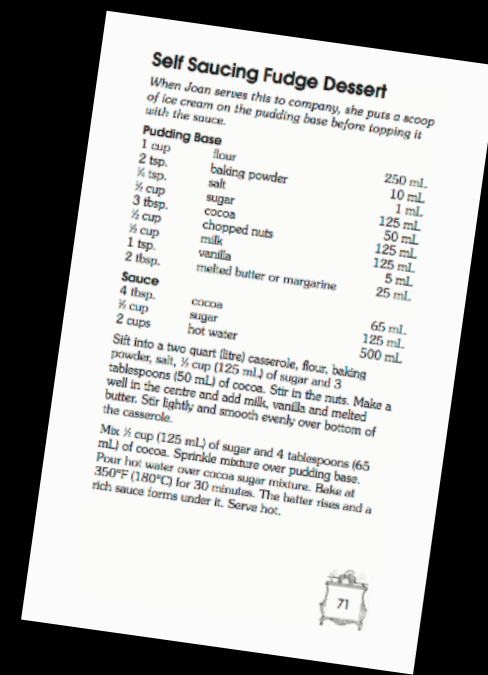


Zoom_IT.download.recipe.yaml

smithjw-recipes

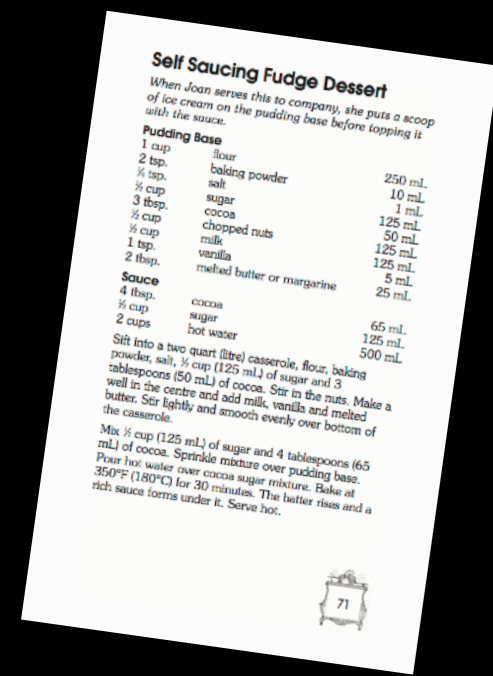


Key	Value/Processors
Identifier	com.github.smithjw.pkg.zoom_it
Input	NAME
ParentRecipe	com.github.smithjw.download.zoom_it
Process	FlatPkgUnpacker PkgPayloadUnpacker Versioner com.github.homebysix.VersionSplitter/VersionSplitter PkgCopier com.github.smithjw.processors/FriendlyPathDeleter



Custom Processors

- Perform tasks not covered by Core processors
- Maintained by an individual (or organization)
- Less trusted
- Kept with recipe that uses it

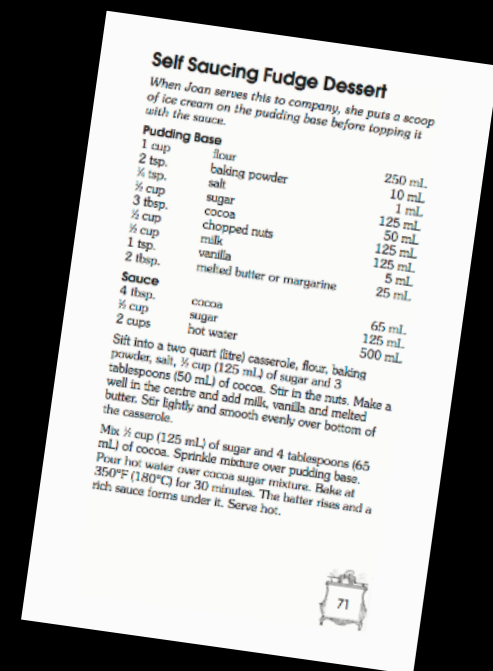


Shared Processors

- Custom processor with a stub recipe
 - ▶ e.g., `com.github.homebysix.VersionSplitter/VersionSplitter`
 - ▶ e.g.2, `com.github.smithjw.processors/FriendlyPathDeleter`
- Custom processor that you can reference
 - ▶ e.g., `com.github.dataJAR-recipes.munki.Adobe Lightroom Classic/AdobeAdminConsolePackagesPkgInfoCreator`

More Shared Processors:

github.com/autopkg/autopkg/wiki/Noteworthy-Processors



Take-Home Exercise



Zoom_IT.pkg

v



Zoom-forIT.pkg

Description: [Censored]
Identifier: com.github.smithjw.processors
Input: {}
MinimumVersion: '2.3'
Process: []

smithjw



Description: Recipe stub for any Processors in this directory.
Identifier: com.github.smithjw.processors
Input: {}
MinimumVersion: '2.3'
Process: []

smithjw

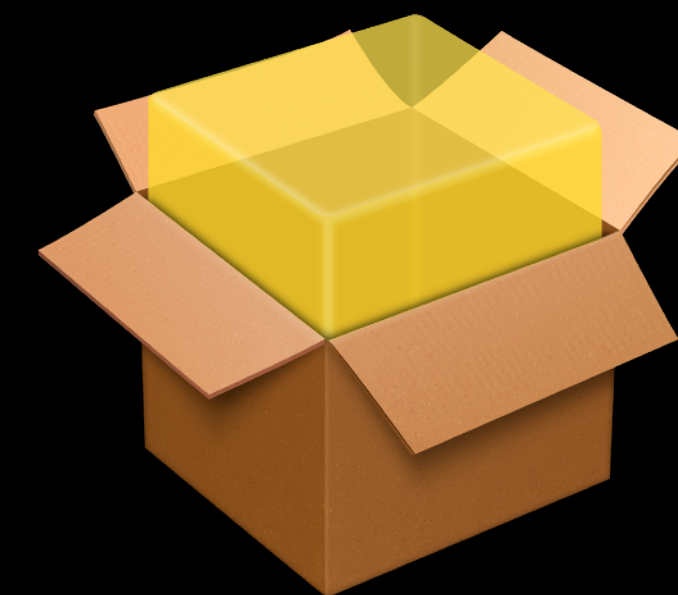


```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE plist PUBLIC "-//Apple//DTD PLIST 1.0//EN" "http://www.apple.com/DTDs/
PropertyList-1.0.dtd">
<plist version="1.0">
<dict>
  <key>Description</key>
  <string>This is a stub recipe to allow convenient shared access to the processors in
this directory.</string>
  <key>Identifier</key>
  <string>com.github.jazzace.processors</string>
  <key>Input</key>
  <dict/>
  <key>MinimumVersion</key>
  <string>2.0</string>
  <key>Process</key>
  <array/>
</dict>
</plist>
```

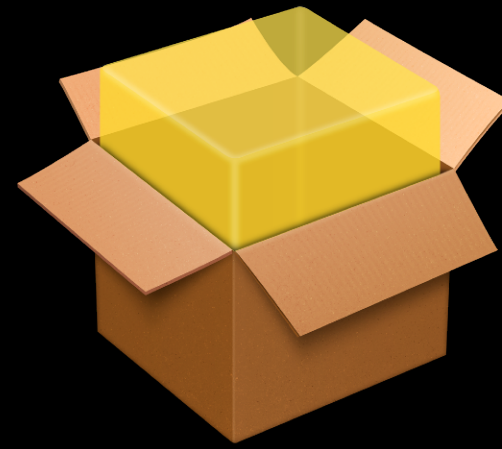
jazzace



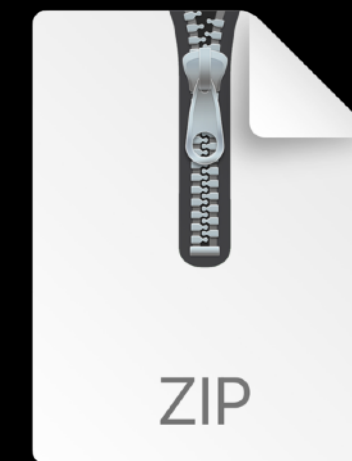
Writing a Pkg Recipe



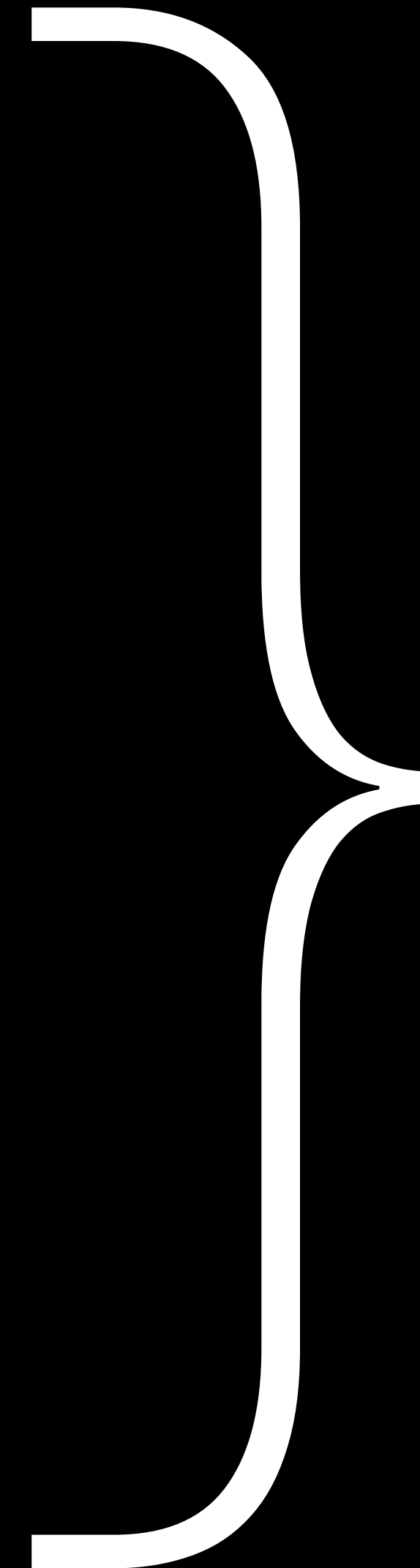
pkg



app

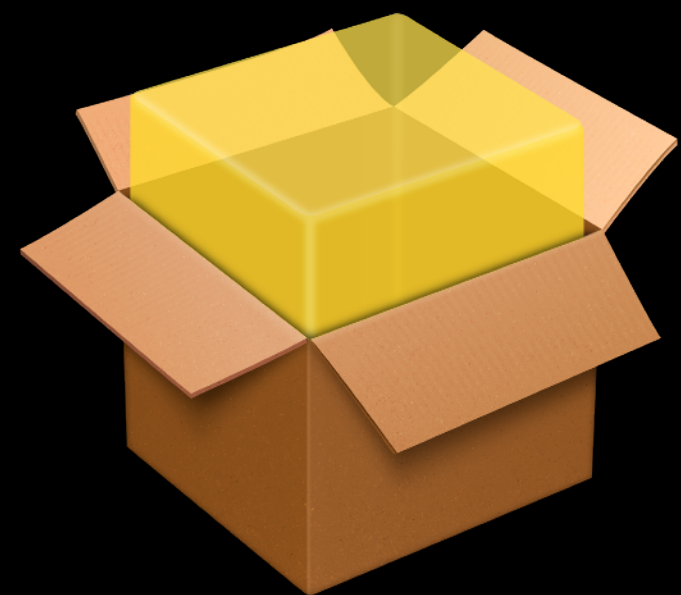


other



.download

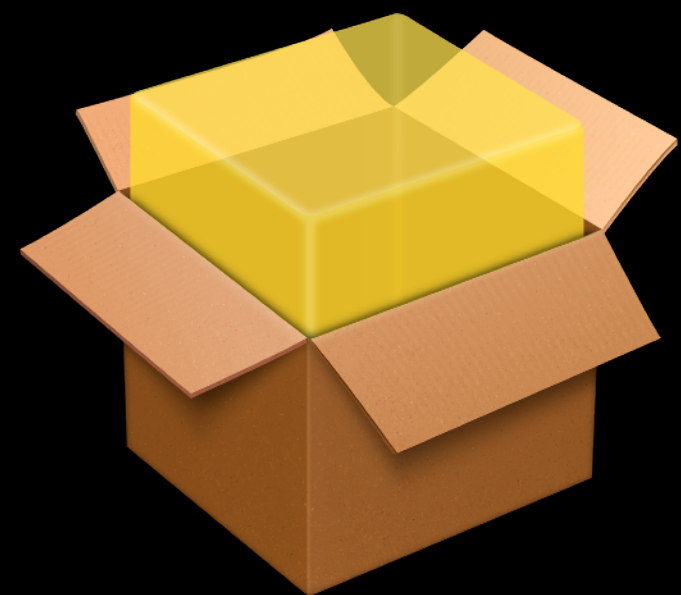
.pkg



Pkg Recipe Categories

- Extract pkg* and rename with version*
- Extract app* and package it
- Build a more specialized package
 - ▶ *Fix vendor package*
 - ▶ *Add a script (e.g., postinstall)*
 - ▶ *Combine multiple resources into a single package*

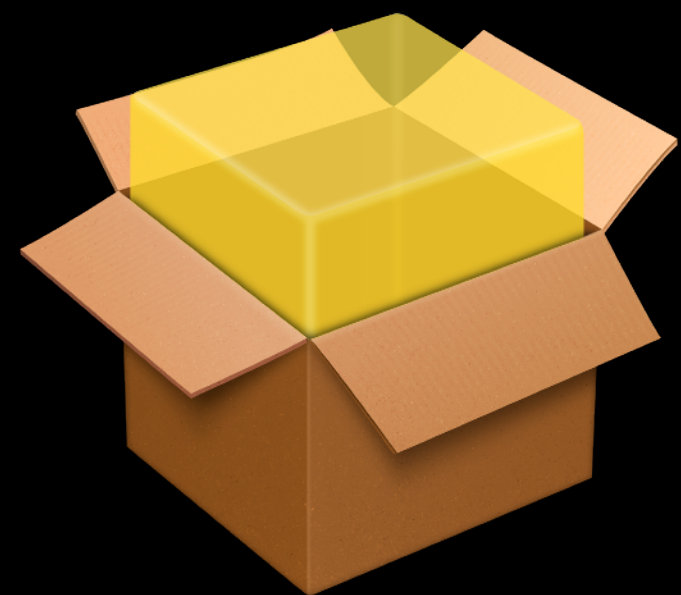
* if necessary



Creating a Recipe

- ~~Steal~~ Adapt an existing recipe
- Recipe Robot
- Write it from scratch





Creating a Recipe

- ~~Steal~~ Adapt an existing recipe
- Recipe Robot
- Write it from scratch



`autopkg new-recipe recipeName.function.recipe`

- Leverage an existing parent recipe if you can



Hands-on Exercise

Write a pkg recipe in one of these ways:

- As a child to an existing download
- Modify an existing pkg recipe to manipulate the version
- Use the PkgRequired processor to write a pkg recipe for an app/pkg/dmg already on your system



Hands-on Exercise

Discussion:

- What did you learn?
- Where did you stumble?

Advanced Recipe Techniques





Plist to/from YAML

► `plistyamlplist`

► github.com/grahampugh/plist-yaml-plist





Special Care Needed

- **Plist:**
 - ▶ *encode < > & (< > &)*
- **YAML:**
 - ▶ *single-quote strings with colon space (:) inside*
 - ▶ *single-quote strings that begin with " or %
(or escape initial character with \)*

Description: Downloads the latest versions (ARM and INTEL) of GitHub Desktop.
Identifier: com.github.smithjw.download.GitHub_Desktop-Universal
MinimumVersion: '2.3'

Input:

NAME: GitHub Desktop
SOFTWARE_TITLE: GitHub_Desktop
URL_ARM64: <https://central.github.com/deployments/desktop/desktop/latest/darwin-arm64>
URL_X86_64: <https://central.github.com/deployments/desktop/desktop/latest/darwin>

Process:

- Processor: URLDownloader
Arguments:
 - filename: '%SOFTWARE_TITLE%-arm64.zip'
 - download_dir: '%RECIPE_CACHE_DIR%/downloads'
 - url: '%URL_ARM64%'
- Processor: URLDownloader
Arguments:
 - filename: '%SOFTWARE_TITLE%-x86_64.zip'
 - download_dir: '%RECIPE_CACHE_DIR%/downloads'
 - url: '%URL_X86_64%'
- Processor: EndOfCheckPhase
- Processor: Unarchiver
Arguments:
 - archive_path: '%RECIPE_CACHE_DIR%/downloads/%SOFTWARE_TITLE%-arm64.zip'
 - destination_path: '%RECIPE_CACHE_DIR%/unpack/arm64'
 - purge_destination: true
- Processor: Unarchiver
Arguments:
 - archive_path: '%RECIPE_CACHE_DIR%/downloads/%SOFTWARE_TITLE%-x86_64.zip'
 - destination_path: '%RECIPE_CACHE_DIR%/unpack/x86_64'
 - purge_destination: true
- Processor: CodeSignatureVerifier

smithjw



```
- Processor: EndOfCheckPhase

- Processor: Unarchiver
  Arguments:
    archive_path: '%RECIPE_CACHE_DIR%/downloads/%SOFTWARE_TITLE%-arm64.zip'
    destination_path: '%RECIPE_CACHE_DIR%/unpack/arm64'
    purge_destination: true

- Processor: Unarchiver
  Arguments:
    archive_path: '%RECIPE_CACHE_DIR%/downloads/%SOFTWARE_TITLE%-x86_64.zip'
    destination_path: '%RECIPE_CACHE_DIR%/unpack/x86_64'
    purge_destination: true

- Processor: CodeSignatureVerifier
  Arguments:
    input_path: '%RECIPE_CACHE_DIR%/unpack/arm64/GitHub Desktop.app'
    requirement: '(identifier "com.github.GitHub" or identifier "com.github.GHAskPass") and anchor apple generic
and certificate leaf[field.1.2.840.113635.100.6.1.9] /* exists */ or anchor apple generic and certificate
1[field.1.2.840.113635.100.6.2.6] /* exists */ and certificate leaf[field.1.2.840.113635.100.6.1.13] /* exists */ and
certificate leaf[subject.OU] = VEKTX9H2N7'
    deep_verification: true
    strict_verification: true

- Processor: CodeSignatureVerifier
  Arguments:
    input_path: '%RECIPE_CACHE_DIR%/unpack/x86_64/GitHub Desktop.app'
    requirement: '(identifier "com.github.GitHub" or identifier "com.github.GHAskPass") and anchor apple generic
and certificate leaf[field.1.2.840.113635.100.6.1.9] /* exists */ or anchor apple generic and certificate
1[field.1.2.840.113635.100.6.2.6] /* exists */ and certificate leaf[field.1.2.840.113635.100.6.1.13] /* exists */ and
certificate leaf[subject.OU] = VEKTX9H2N7'
    deep_verification: true
    strict_verification: true

- Processor: Versioner
  Arguments:
    input_plist_path: '%RECIPE_CACHE_DIR%/unpack/arm64/GitHub Desktop.app/Contents/Info.plist'
    plist_version_key: CFBundleShortVersionString
```

smithjw



Description: Downloads the latest version of GitHub Desktop and creates a package.
Identifier: com.github.smithjw.pkg.GitHub_Desktop-Universal
ParentRecipe: com.github.smithjw.download.GitHub_Desktop-Universal
MinimumVersion: '2.3'

Input:

NAME: GitHub Desktop
SOFTWARE_TITLE: GitHub_Desktop

Process:

- Processor: PkgRootCreator
Arguments:
pkgroot: '%RECIPE_CACHE_DIR%/Universal'
pkgdirs:
pkgroot: '0775'
Scripts: '0775'
- Processor: AppPkgCreator
Arguments:
app_path: '%RECIPE_CACHE_DIR%/unpack/arm64/GitHub Desktop.app'
pkg_path: '%RECIPE_CACHE_DIR%/Universal/Scripts/%SOFTWARE_TITLE%-arm64-%version%.pkg'
- Processor: AppPkgCreator
Arguments:
app_path: '%RECIPE_CACHE_DIR%/unpack/x86_64/GitHub Desktop.app'
pkg_path: '%RECIPE_CACHE_DIR%/Universal/Scripts/%SOFTWARE_TITLE%-x86_64-%version%.pkg'
- Processor: FileCreator
Arguments:
file_path: '%RECIPE_CACHE_DIR%/Universal/Scripts/preinstall'
file_mode: '0755'
file_content: |
#!/bin/bash

arm64_package="%SOFTWARE_TITLE%-arm64-%version%.pkg"
x86_64_package="%SOFTWARE_TITLE%-x86_64-%version%.pkg"

if [[\$(/usr/bin/arch) = arm64*]]; then

smithjw



```
Arguments:
  app_path: '%RECIPE_CACHE_DIR%/unpack/x86_64/GitHub Desktop.app'
  pkg_path: '%RECIPE_CACHE_DIR%/Universal/Scripts/%SOFTWARE_TITLE%-x86_64-%version%.pkg'

- Processor: FileCreator
  Arguments:
    file_path: '%RECIPE_CACHE_DIR%/Universal/Scripts/preinstall'
    file_mode: '0755'
    file_content: |
      #!/bin/bash

      arm64_package="%SOFTWARE_TITLE%-arm64-%version%.pkg"
      x86_64_package="%SOFTWARE_TITLE%-x86_64-%version%.pkg"

      if [[ $( /usr/bin/arch ) = arm64* ]]; then
        /usr/sbin/installer -pkg "$arm64_package" -target "$3"
      else
        /usr/sbin/installer -pkg "$x86_64_package" -target "$3"
      fi

      exit 0

- Processor: PkgCreator
  Arguments:
    pkg_request:
      id: '%bundleid%'
      version: '%version%'
      options: purge_ds_store
      pkgname: '%SOFTWARE_TITLE%-Universal-%version%'
      pkgdir: '%RECIPE_CACHE_DIR%'
      scripts: '%RECIPE_CACHE_DIR%/Universal/Scripts'
      pkgroot: '%RECIPE_CACHE_DIR%/Universal/pkgroot'

- Processor: com.github.smithjw.processors/FriendlyPathDeleter
  Arguments:
    fail_deleter_silently: true
    path_list:
      - '%RECIPE_CACHE_DIR%/Universal'
      - '%RECIPE_CACHE_DIR%/unpack'
```

smithjw



GitHub_Desktop-Universal.download.recipe.yaml

Key	Value/Processors
Input	NAME, SOFTWARE_TITLE, URL_ARM64, URL_X86_64
Process	URLDownloader × 2 EndOfCheckPhase Unarchiver × 2 CodeSignatureVerifier × 2

GitHub_Desktop-Universal.pkg.recipe.yaml

Key	Value/Processors
Process	PkgRootCreator AppPkgCreator × 2 FileCreator PkgCreator com.github.smithjw.processors/FriendlyPathDeleter



Take-Home Exercises

- **jazzace-recipes:**
 - ▶ *AbletonLiveSassafras.pkg (Ableton folder)*
 - Automates manual vendor instructions
(link to instructions in recipe Description)
- **rtrouton-recipes**
 - ▶ *Any of the Microsoft Office recipes*
 - Master recipe with product recipes that set FWLink value
 - Elaborate process to version some products