



#! Scripting OS X

Armin Briegel

pro warehouse

scriptingosx.com/swift



Swift

for Apple Admins



BASH
THE BOURNE-AGAIN SHELL



AppleScript



Swift

Cutting corners to meet arbitrary management deadlines



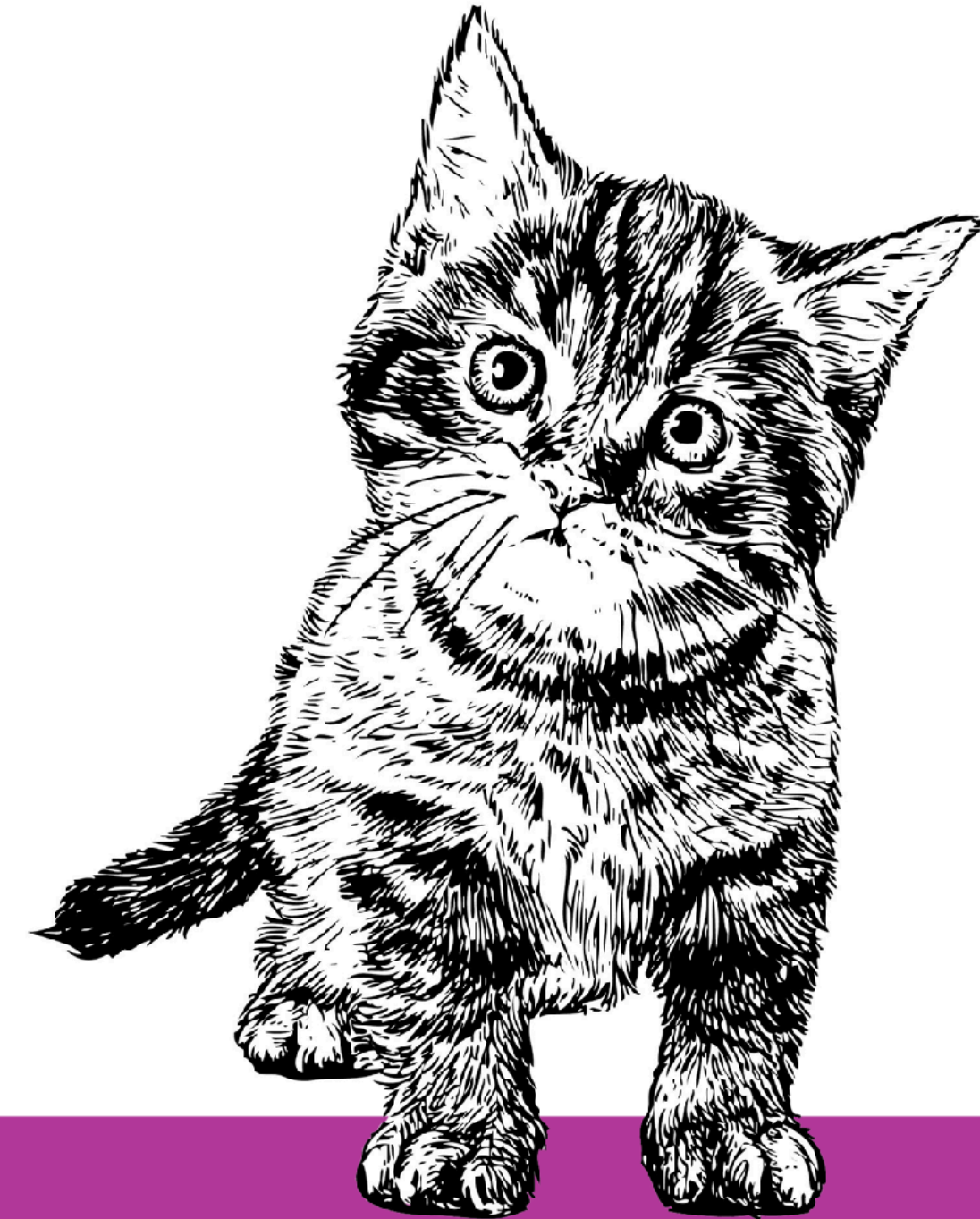
Essential

Copying and Pasting from Stack Overflow

O'REILLY®

The Practical Developer
@ThePracticalDev

How to actually learn any new programming concept



Essential

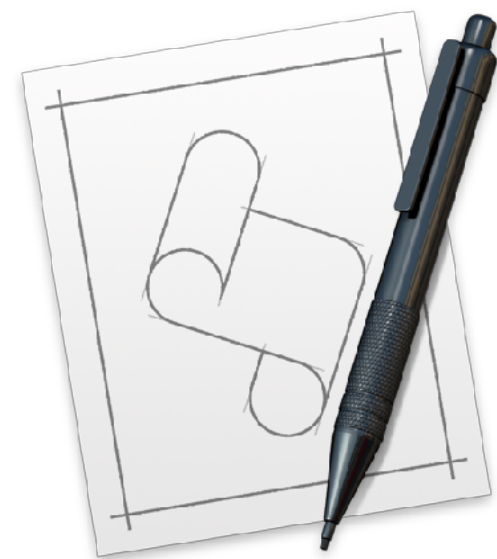
Changing Stuff and Seeing What Happens

O RLY?

@ThePracticalDev







AppleScript





Swift

for Apple Admins

Why?

**“Objective-C
without the C”**

–Craig Federighi



Swift

for Apple Admins

Swift
Fast
Modern
Safe
Interactive



Swift

Closure

Generics

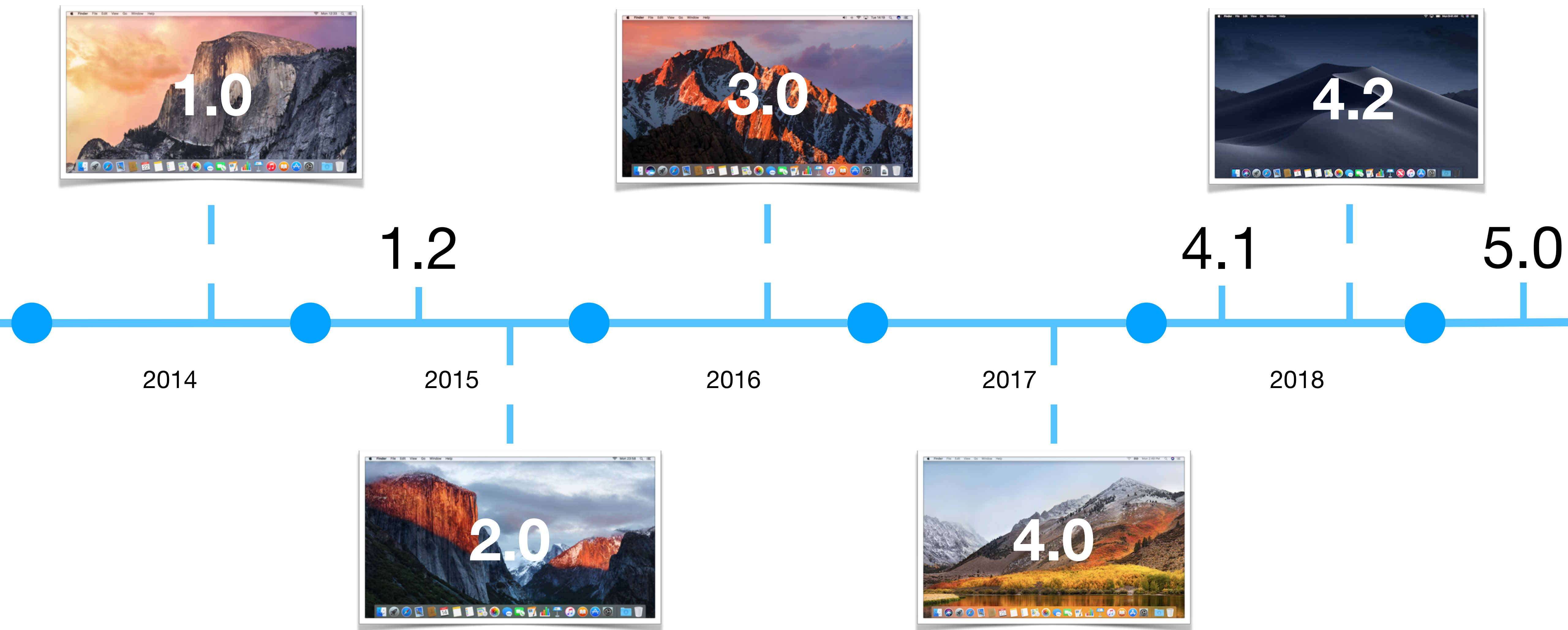
Multiple Return Values

Type Inference





Swift release dates





[ABOUT SWIFT](#)[BLOG](#)[DOWNLOAD](#)[GETTING STARTED](#)[DOCUMENTATION](#)[SOURCE CODE](#)[COMMUNITY](#)[CONTRIBUTING](#)[CONTINUOUS
INTEGRATION](#)

Welcome to Swift.org

Welcome to the Swift community. Together we are working to build a programming language to empower everyone to turn their ideas into apps on any platform.

Announced in 2014, the Swift programming language has quickly become one of the fastest growing languages in history. Swift makes it easy to write software that is incredibly fast and safe by design. Our goals for Swift are ambitious: we want to make programming simple things easy, and difficult things possible.

For students, learning Swift has been a great and best practices. And because it is open, the even broader range of platforms, from mobile





Swift@IBM

Build powerful, fast and secure Swift apps for the server

Quick Start Tutorial

Get your first server side Swift app created and deployed in just minutes.

[Get Started](#)

Tutorials

Access tutorials, guides and walkthroughs for building Swift applications on IBM Cloud.

[View Tutorials](#)

Resources

Get samples, downloads, and tools for your next server side Swift project.

[View resources](#)



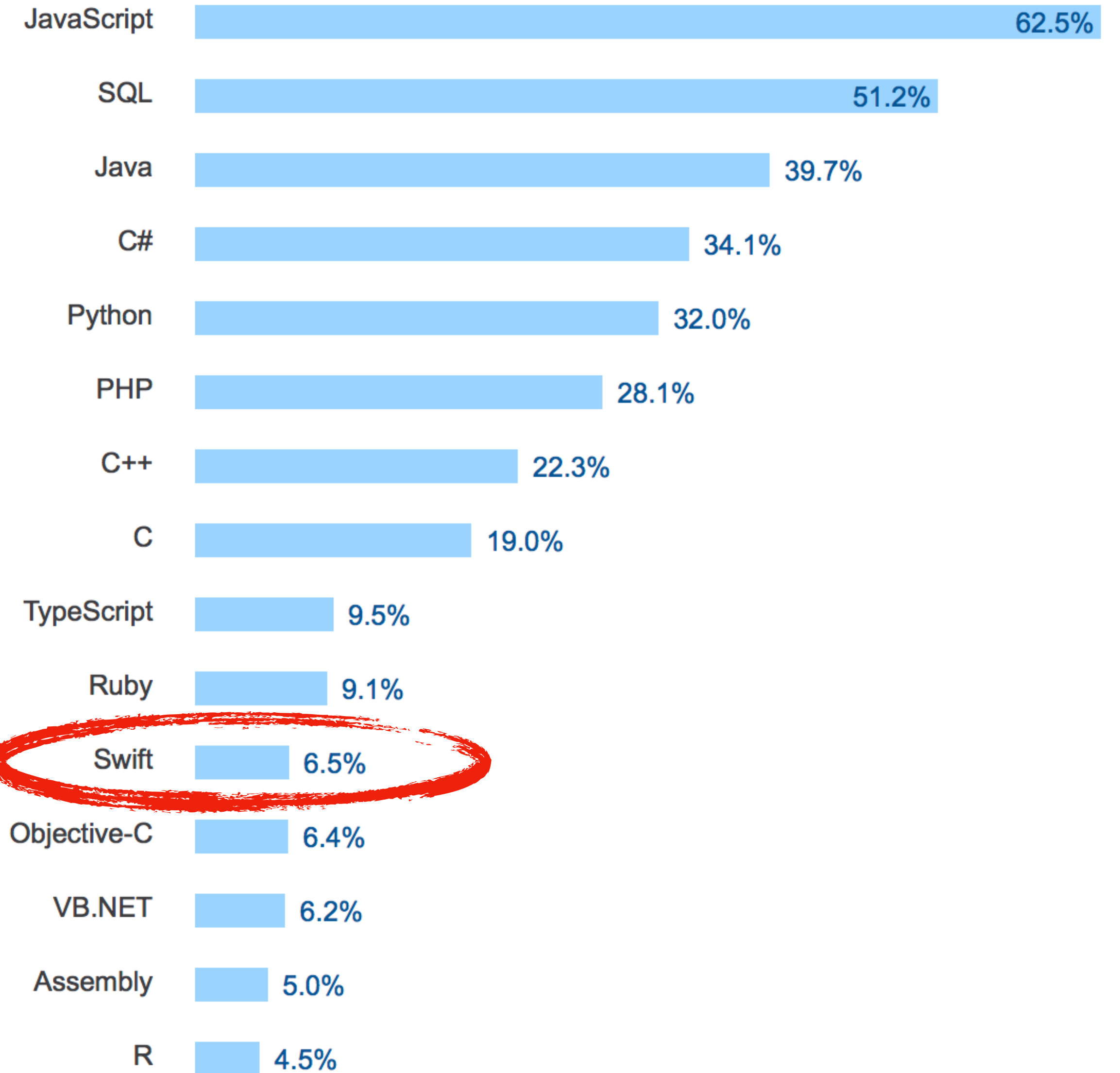
Developer Survey Results 2017

Programming Languages

% of This Category

% of All Respondents

% of Professional Developers



Create ML

First Swift only Framework
from Apple



Mojave - Signed Command Line Tools

- (Pre-)Approval for TCC requires signed apps, scripts or binaries
- Signing binaries built-in to Xcode
- Sign python or bash scripts
 - Signature stored in extended attribute

Mojave - Notarization

- Additional macOS code certification from Apple
- Voluntary in Mojave, mandatory in future macOS
- App bundles only, no CLI tools, no scripts

Scripting Language

Compiled Languages

Bash, Python, Ruby, Perl, JavaScript, PHP, AppleScript

C, C++, C#, Objective-C, Swift, Java, Go

Interpreted Text Files

Binaries (compiled from text code files)

"Low" performance

"High" performance

Libraries or Modules at run time

Libraries or Frameworks at compile time

Deploy and Manage interpreter

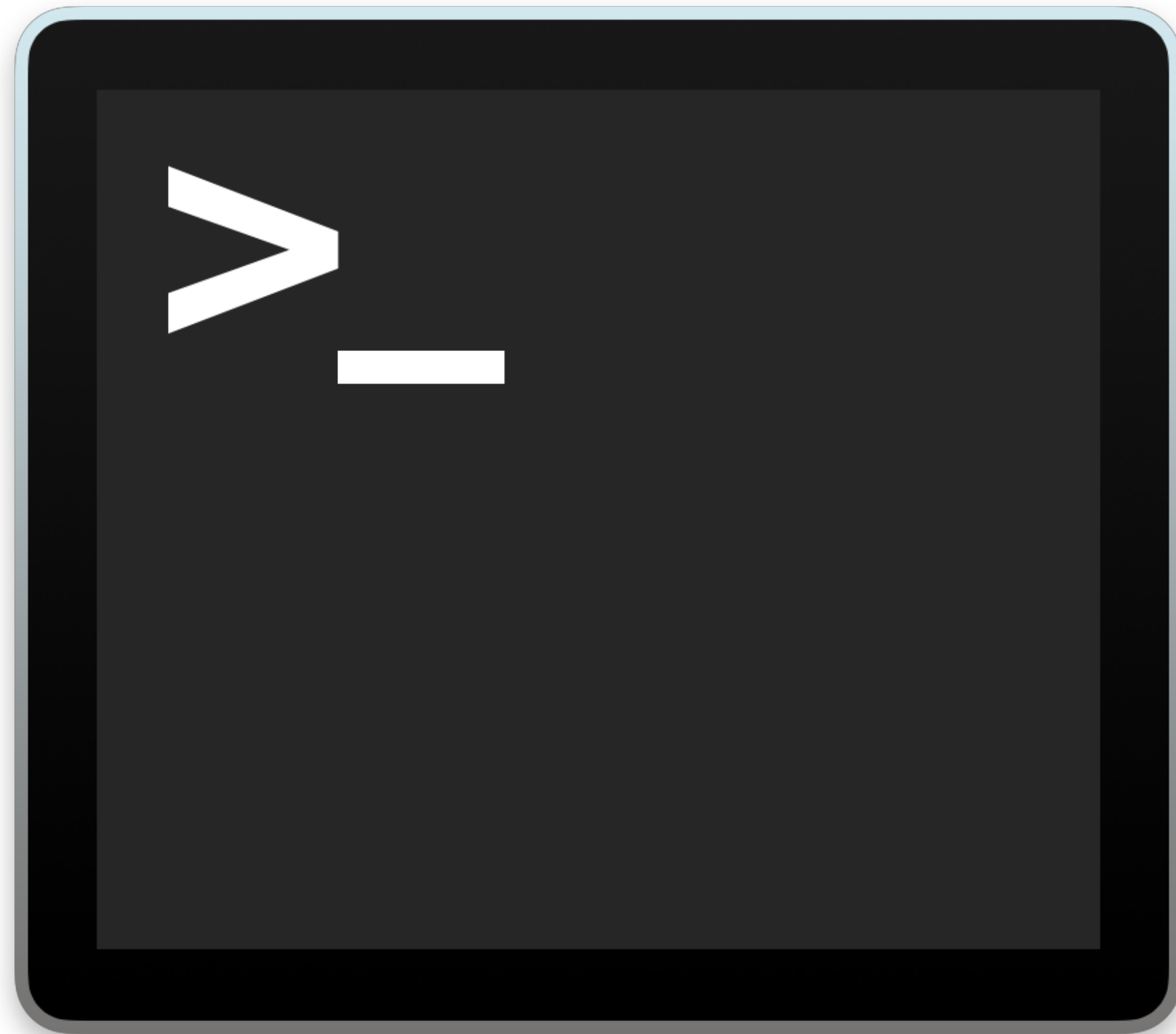
Script files in management system

Deploy binary or app bundle

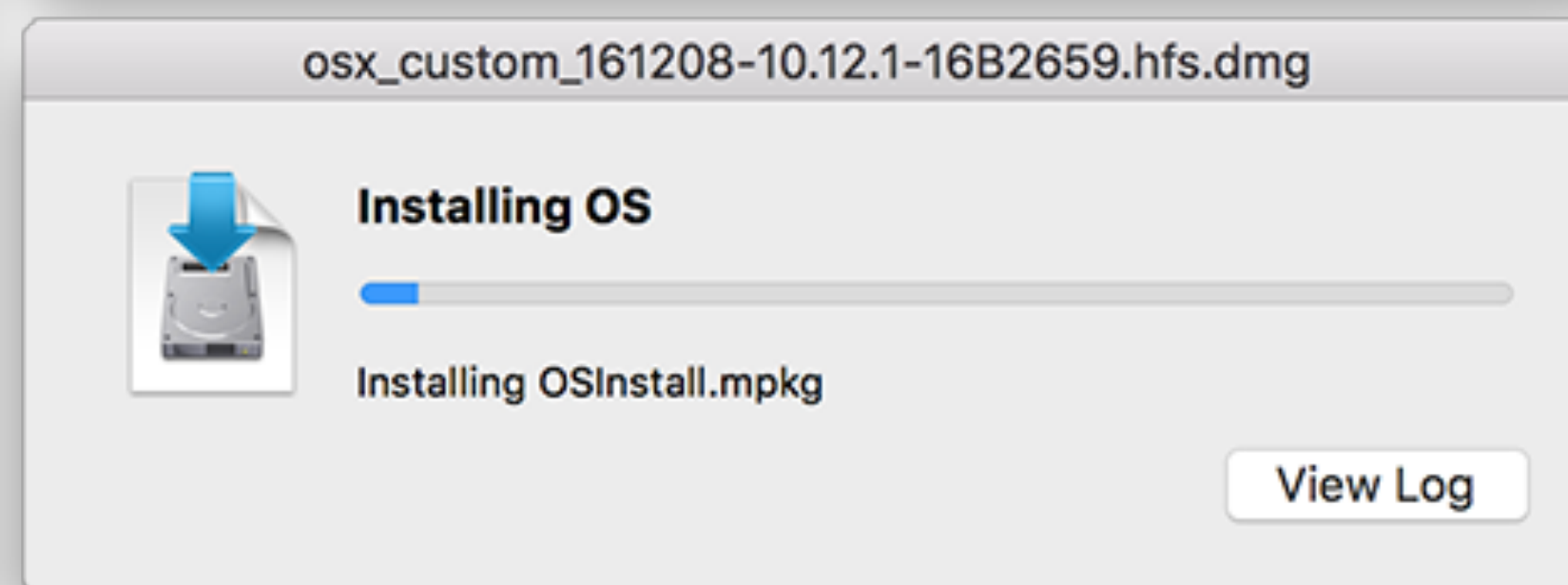
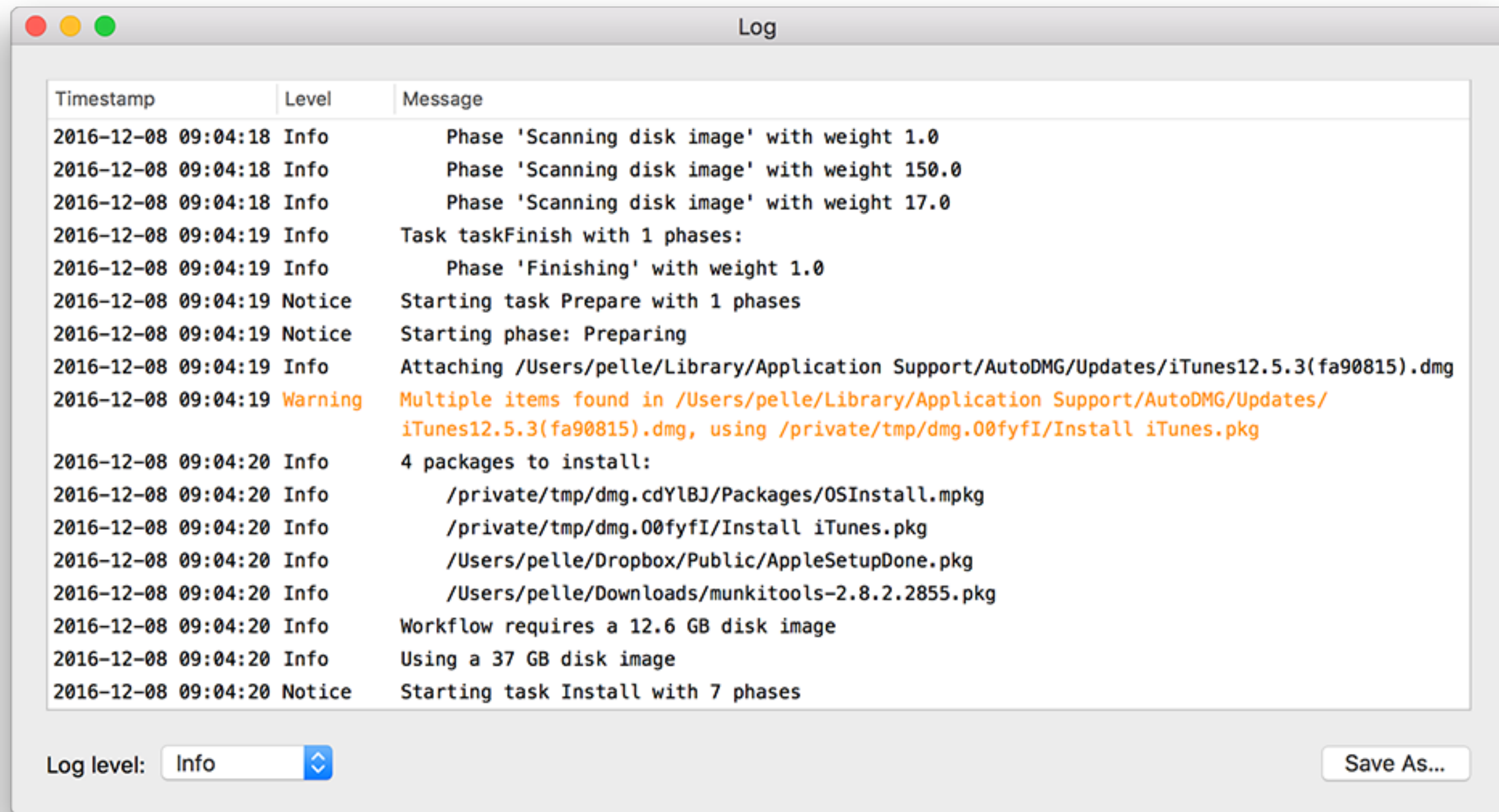
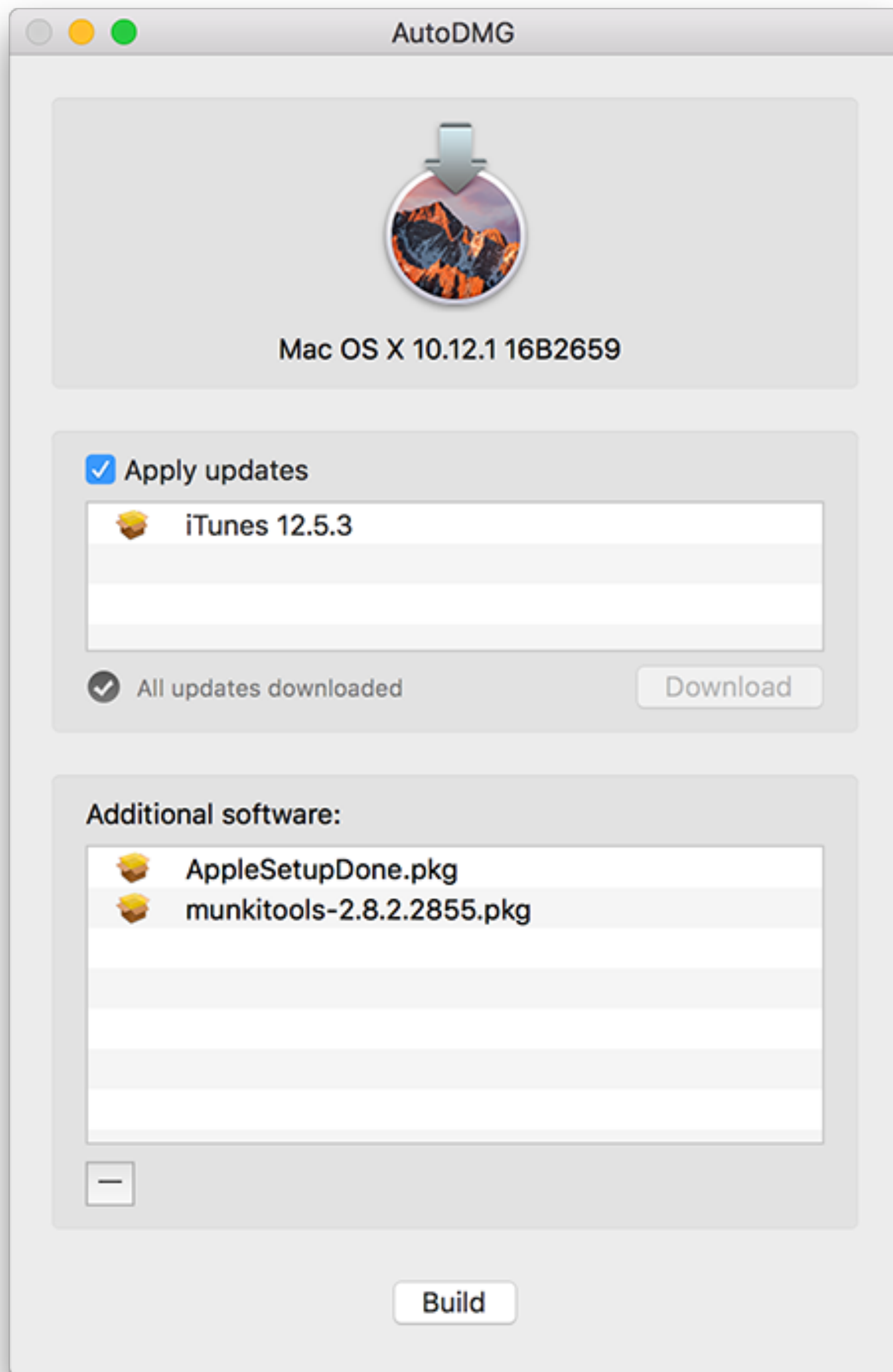


pythonTM

Python - Command line tools



- AutoPkg
- outset
- make-profile-pkg
- etc.



Managed Software Center

Software

Categories

My Items

Updates

Q Search

Managed Software Center

Your source for software for your Mac.

All items

Categories



1Password

Utilities - AgileBits Inc.

INSTALL



Acorn 4

INSTALL



Adium

Communication - The Adium Team

INSTALL



Adobe Acrobat Reader DC

Uncategorized

INSTALL



Adobe Flash Player

Internet - Adobe

Installed

REMOVE



Adobe Reader

Productivity - Adobe

INSTALL



Adware Medic

Utilities - Thomas Reed

INSTALL



Airfoil

Media - Rogue Amoeba

INSTALL



Alfred 2

Utilities - Running with Crayons Ltd

INSTALL



Alinof Timer

Productivity - Alinof Software Sàrl

INSTALL



Amadeus Lite

Uncategorized

INSTALL



Android Studio

Developer - Google

INSTALL



Apache OpenOffice

Productivity

INSTALL



AppCleaner Uninstaller Utility

OS Utilities - FreeMacSoft

INSTALL



AppCode

Uncategorized

INSTALL

Audio

Communication

Developer

Developer Tools

Development

Drivers

Editors

Email

Graphics & Rendering

Internet

Mail Clients

Mathematics

Media

Media Players

Munki Tools

Network Utilities

OS Utilities

Organization

Productivity

Remote Access

SFTP Clients

Science

Security

Social Networking

System Administration

Objective-C

Python



Obj-C bridge

Cocoa

Python modules

macOS

Objective-C Bridge — PyObjC

Objective-C

```
[ [NSUserDefaults alloc] initWithSuiteName: appID];
```

Python

```
NSUserDefaults.alloc().initWithSuiteName_(appID)
```


Python on macOS

2.7

3

Built-in

Additional install

PyObjC built-in

Additional PyObjC Module

Supported until 2020







AppleScript

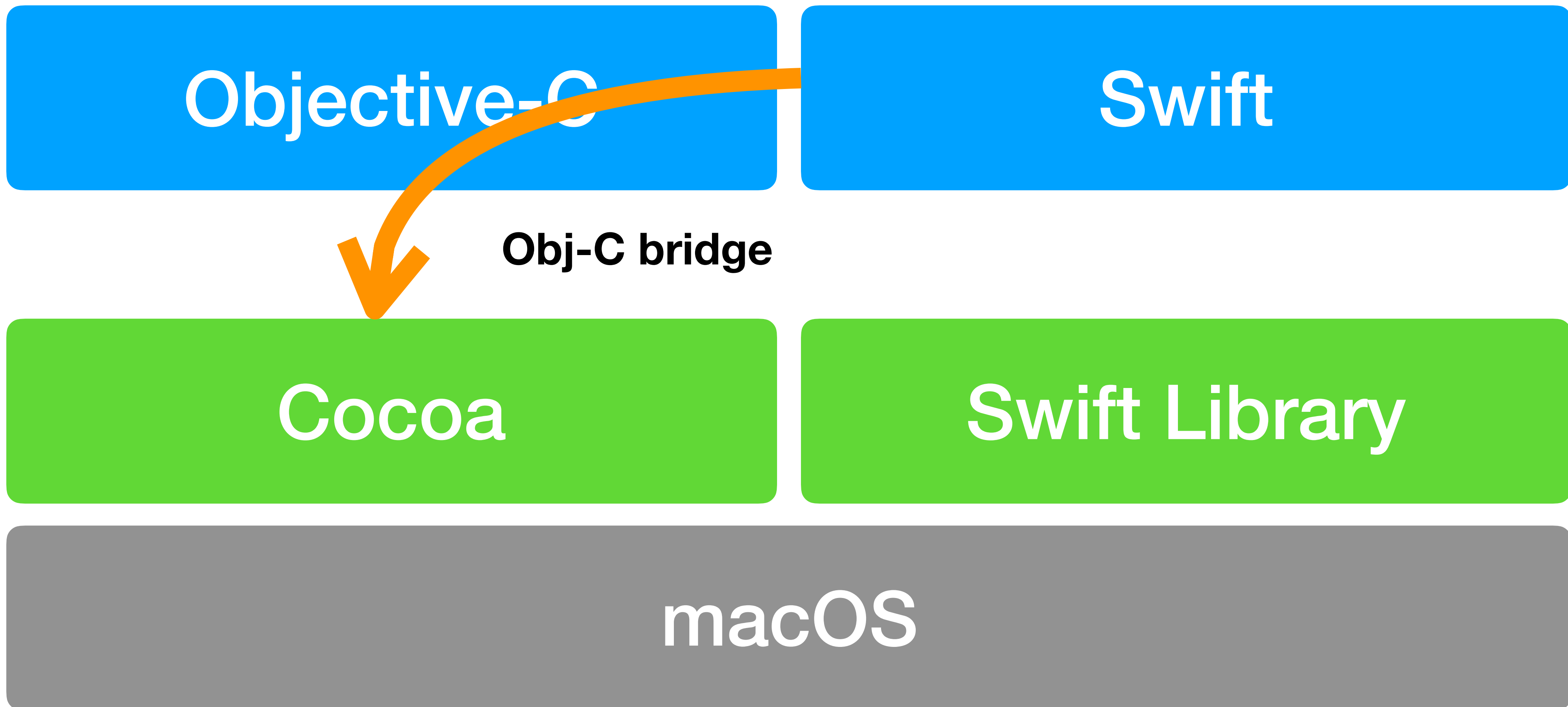


Swift



Swift

for Apple Admins



Objective-C

```
[ [NSUserDefaults alloc] initWithSuiteName: appID];
```

Swift

```
UserDefaults(suiteName: appID)
```

Objective-C

Swift

Cocoa

macOS

Objective-C

Swift

Cocoa + UIKit + WatchKit + TVKit

macOS + iOS + watchOS + tvOS



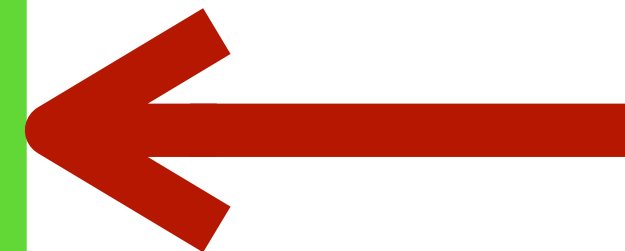
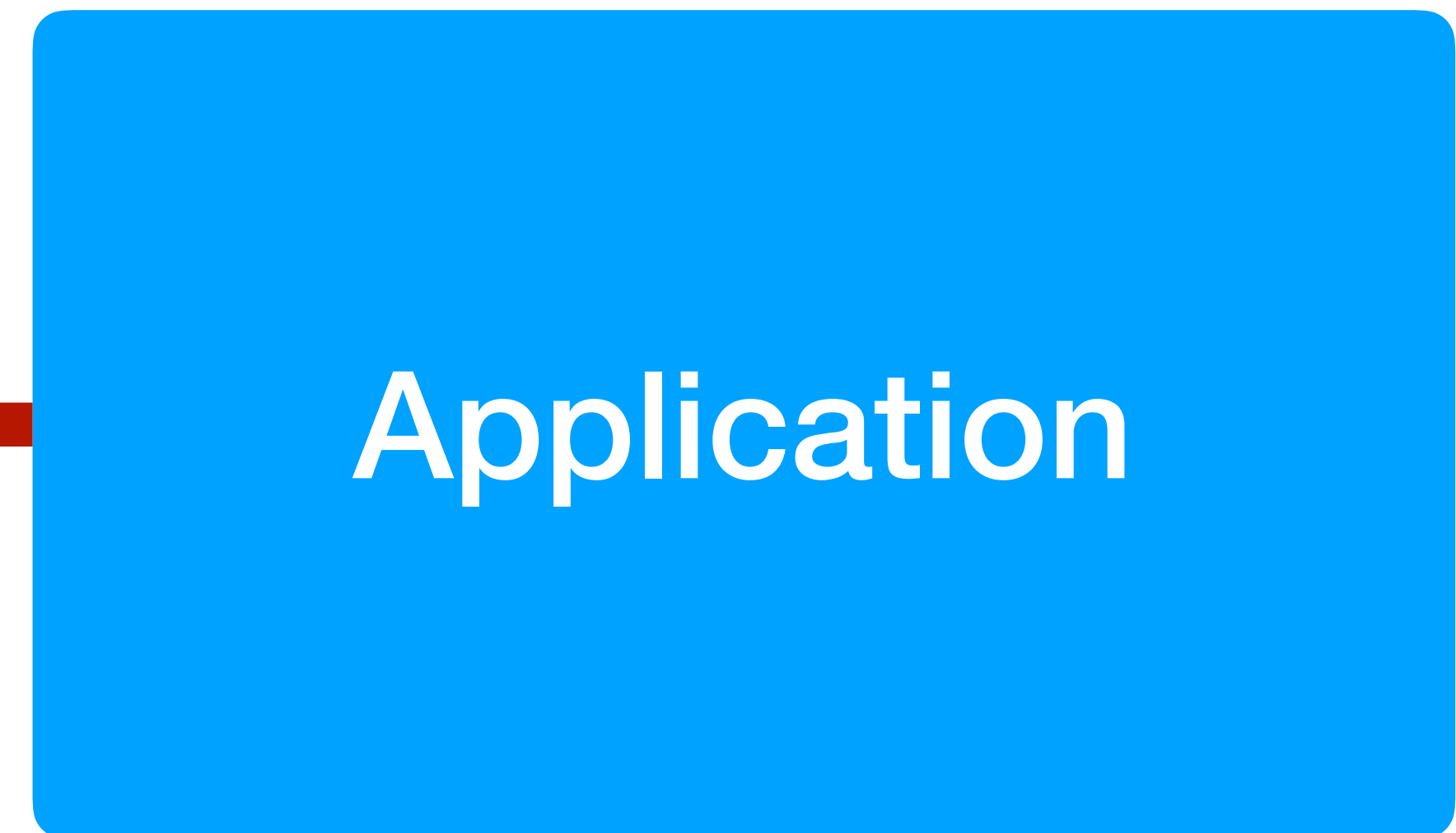
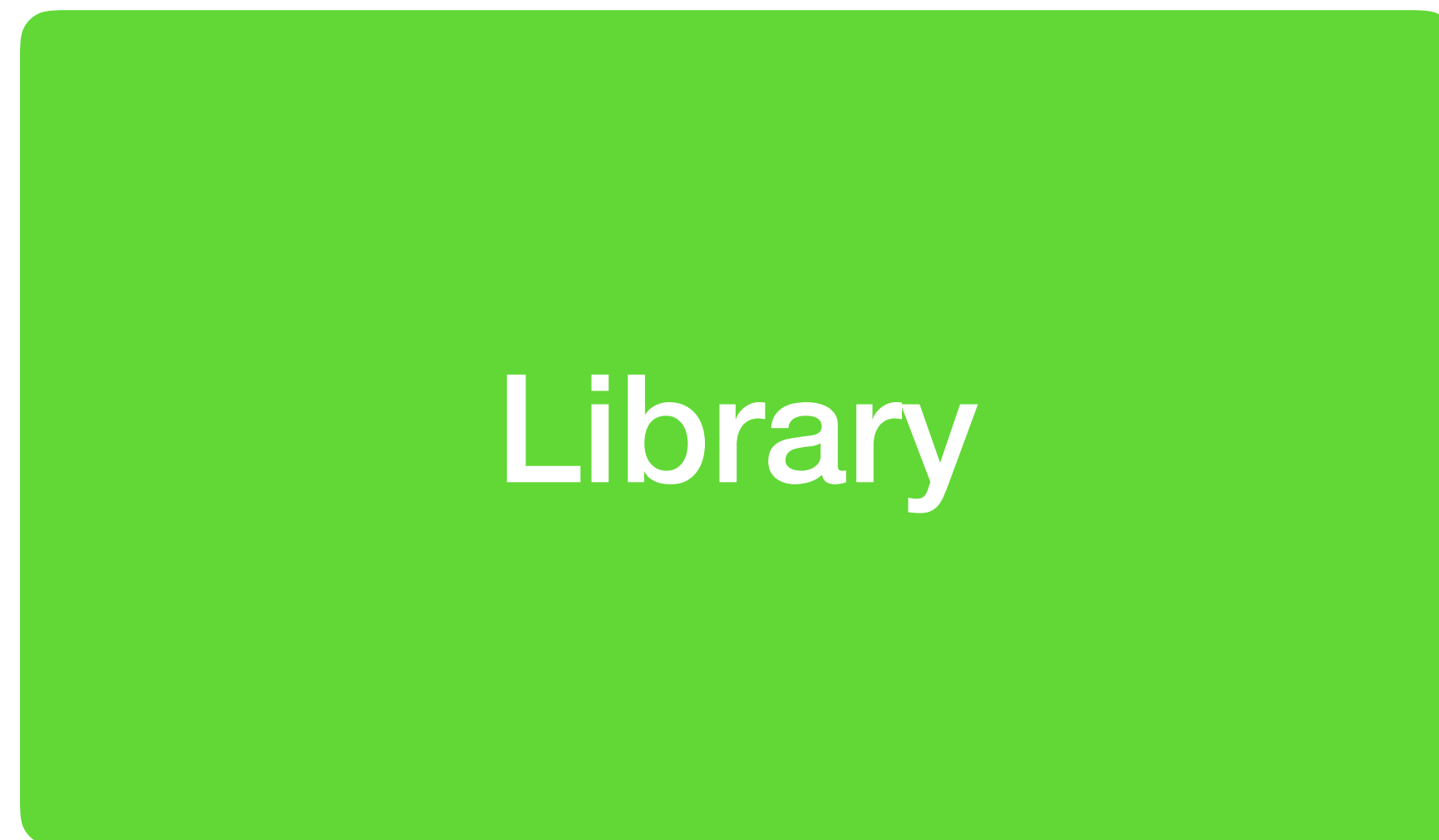
Swift – ABI stability

ABI: Application Binary Interface

Link to libraries built by a different compiler version

Compiler Version N

Compiler Version N+1



Swift Compiler



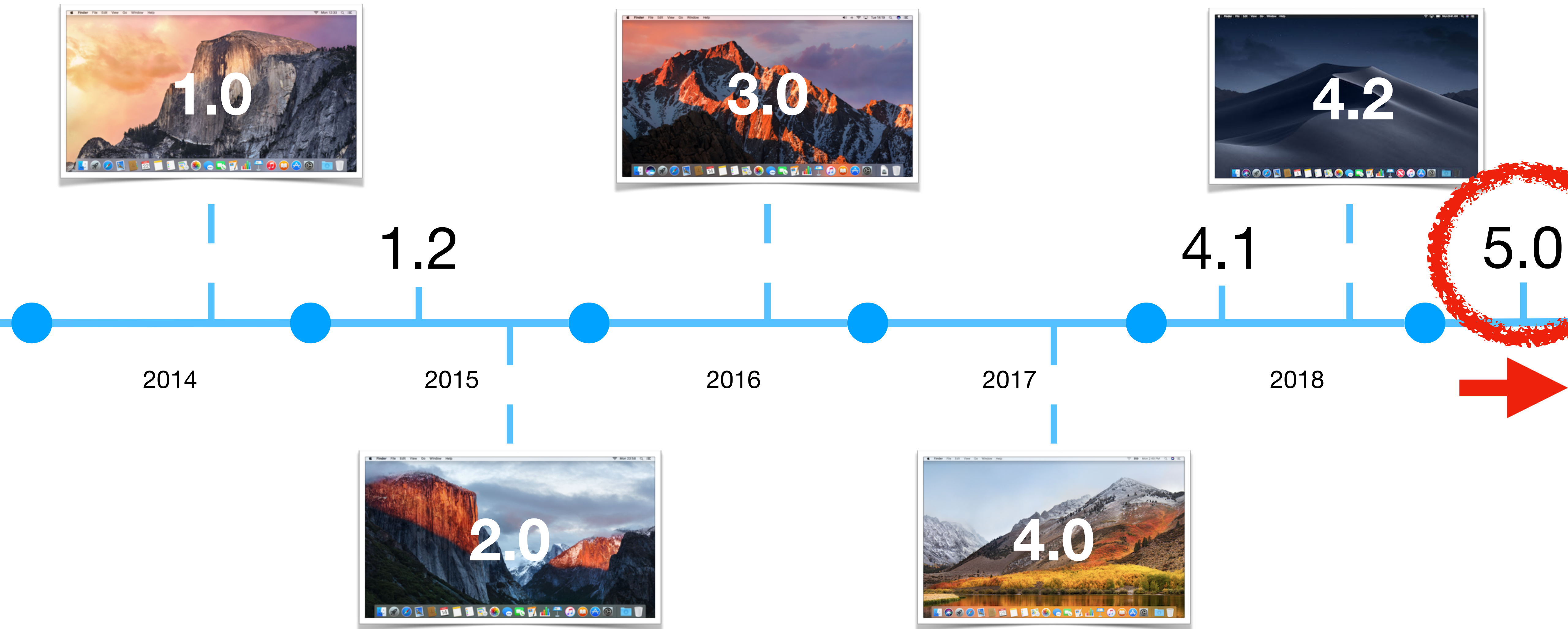
hello
Unix executable - 10,2 MB

Library

Application



Swift – ABI stability



Script files

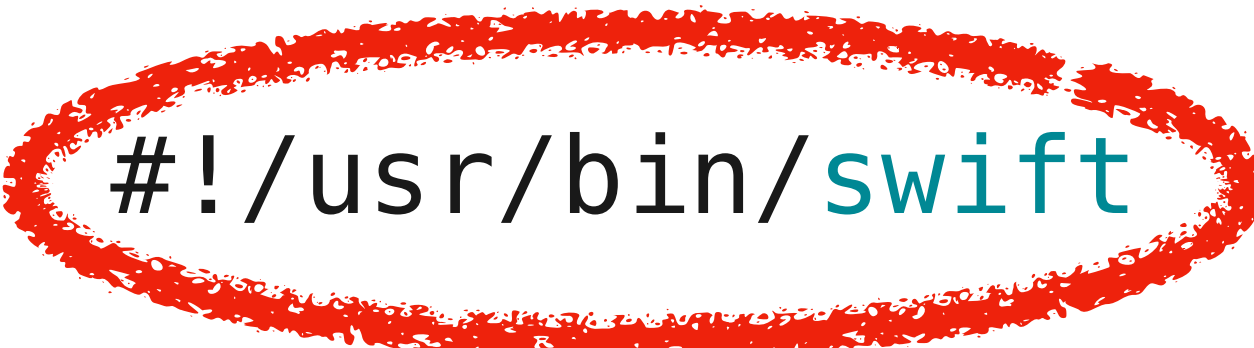


hello.py



hello.sh

Swift – Script files



```
#!/usr/bin/swift
```

```
import Foundation
```

```
// first argument is path to binary, drop it
```

```
let arguments = CommandLine.arguments.dropFirst()
```

```
if arguments.count > 0 {
```

```
    let argumentString = arguments.joined(separator: " ")
```

```
    print("Hello, \(argumentString)")
```

```
} else {
```

```
    print("Hello, anybody!")
```

```
}
```

```
exit(0)
```


Swift – Script files

\$ cd
\$.
Hel



The “swift” command requires the command line developer tools. Would you like to install the tools now?

Choose Install to continue. Choose Get Xcode to install Xcode and the command line developer tools from the App Store.

Get Xcode

Not Now

Install

Get Started!



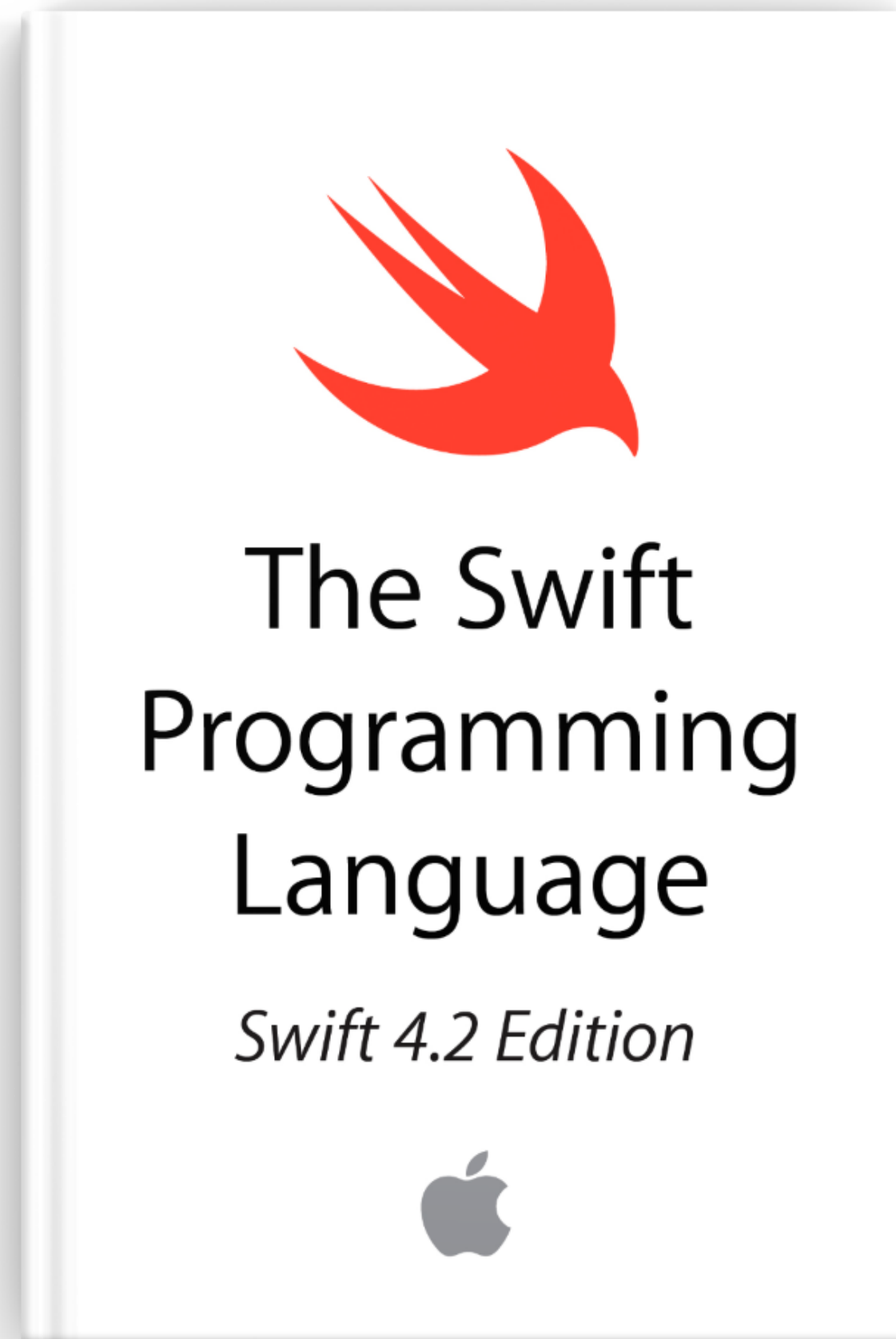
Swift Playgrounds

Learn serious code on your iPad.
In a seriously fun way.

[Download the new Swift Playgrounds free](#) ⬇



Apple Books



Other Resources



Build Command Line Tools

Choose a template for your new project:

iOS watchOS tvOS **macOS** Cross-platform

Filter

Application



Cocoa App



Game



Command Line Tool

Framework & Library



Cocoa Framework



Library



Metal Library



XPC Service



Bundle

Other



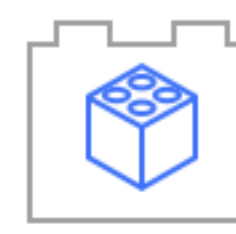
AppleScript App



Automator Action



Contacts Action



Generic Kernel

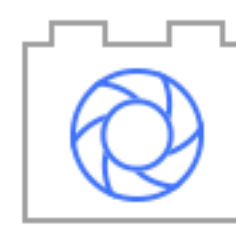
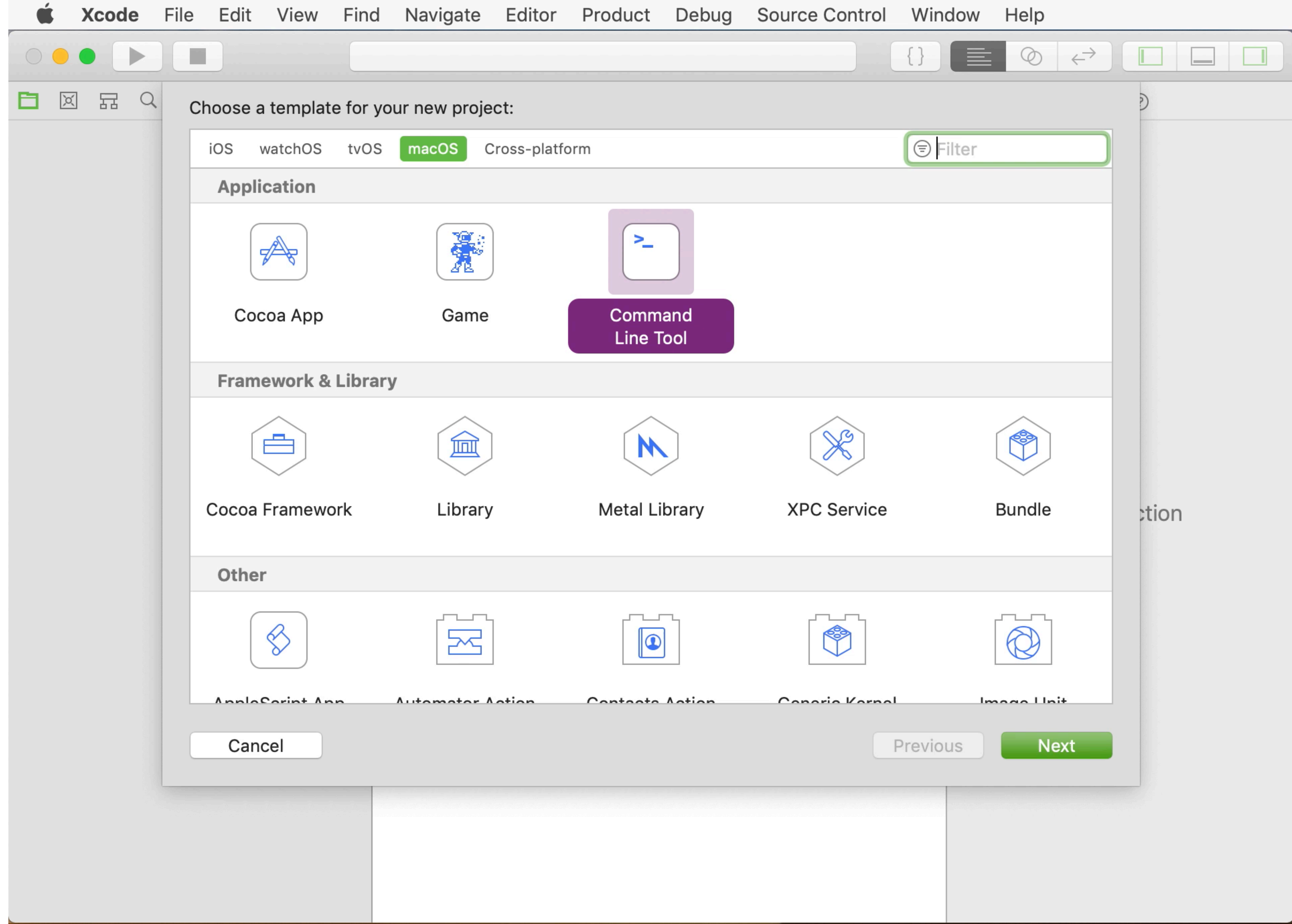


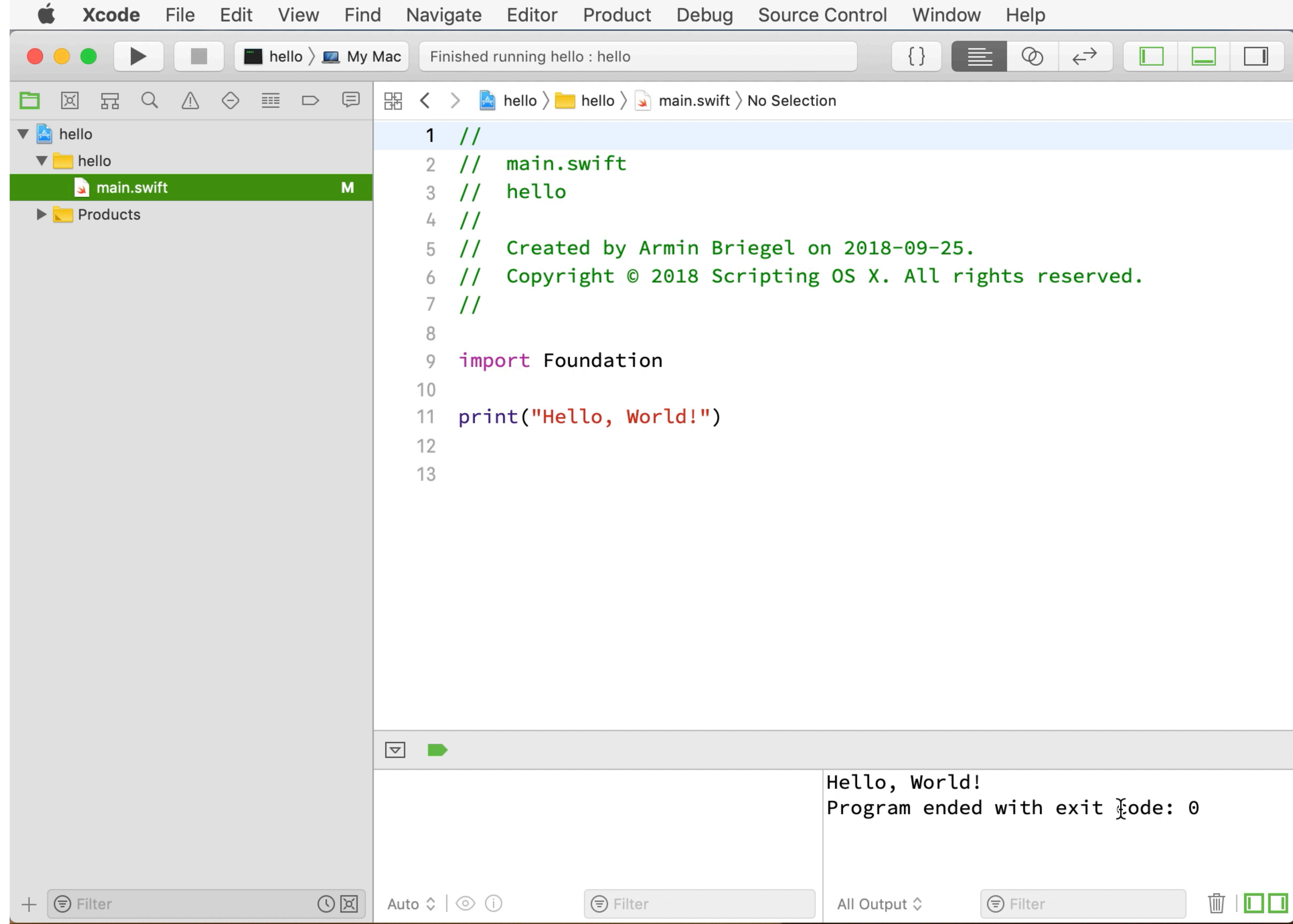
Image Unit

Cancel

Previous

Next






```
// first argument is path to binary. drop it
let arguments = CommandLine.arguments.dropFirst()

if arguments.count > 0 {
    let argumentString = arguments.join(separator: " ")
    print("Hello, \(argumentString)")
} else {
    print("Hello, anybody!")
}

exit(0)
```

```
// first argument is path to binary. drop it
let arguments = CommandLine.arguments.dropFirst()

if arguments.count > 0 {
    let argumentString = arguments.join(separator: " ")
    print("Hello, \(argumentString)")
} else {
    print("Hello, anybody!")
}

exit(0)
```

```
// first argument is path to binary, drop it
let arguments = CommandLine.arguments.dropFirst()

if arguments.count > 0 {
    let argumentString = arguments.joined(separator: " ")
    print("Hello, \(argumentString)")
} else {
    print("Hello, anybody!")
}

exit(0)
```



```
// first argument is path to binary, drop it
let arguments = CommandLine.arguments.dropFirst()

if arguments.count > 0 {
    let argumentString = arguments.joined(separator: " ")
    print("Hello, \(argumentString)")
} else {
    print("Hello, anybody!")
}

exit(0)
```

```
// first argument is path to binary, drop it
let arguments = CommandLine.arguments.dropFirst()

if arguments.count > 0 {
    let argumentString = arguments.joined(separator: " ")
    print("Hello, \(argumentString)")
} else {
    print ("Hello, anybody!")
}

exit(0)
```

```
// first argument is path to binary, drop it
let arguments = CommandLine.arguments.dropFirst()

if arguments.count > 0 {
    let argumentString = arguments.joined(separator: " ")
    print("Hello, \(argumentString)")
} else {
    print ("Hello, anybody!")
}

exit(0)
```


Swift

Closure

Generics

Multiple Return Values

Type Inference



Type Inference

Python: dynamic type

```
a = "a"  
b = 2  
c = a + b
```

TypeError: cannot concatenate
'str' and 'int' objects

Run-time error

Swift: static type

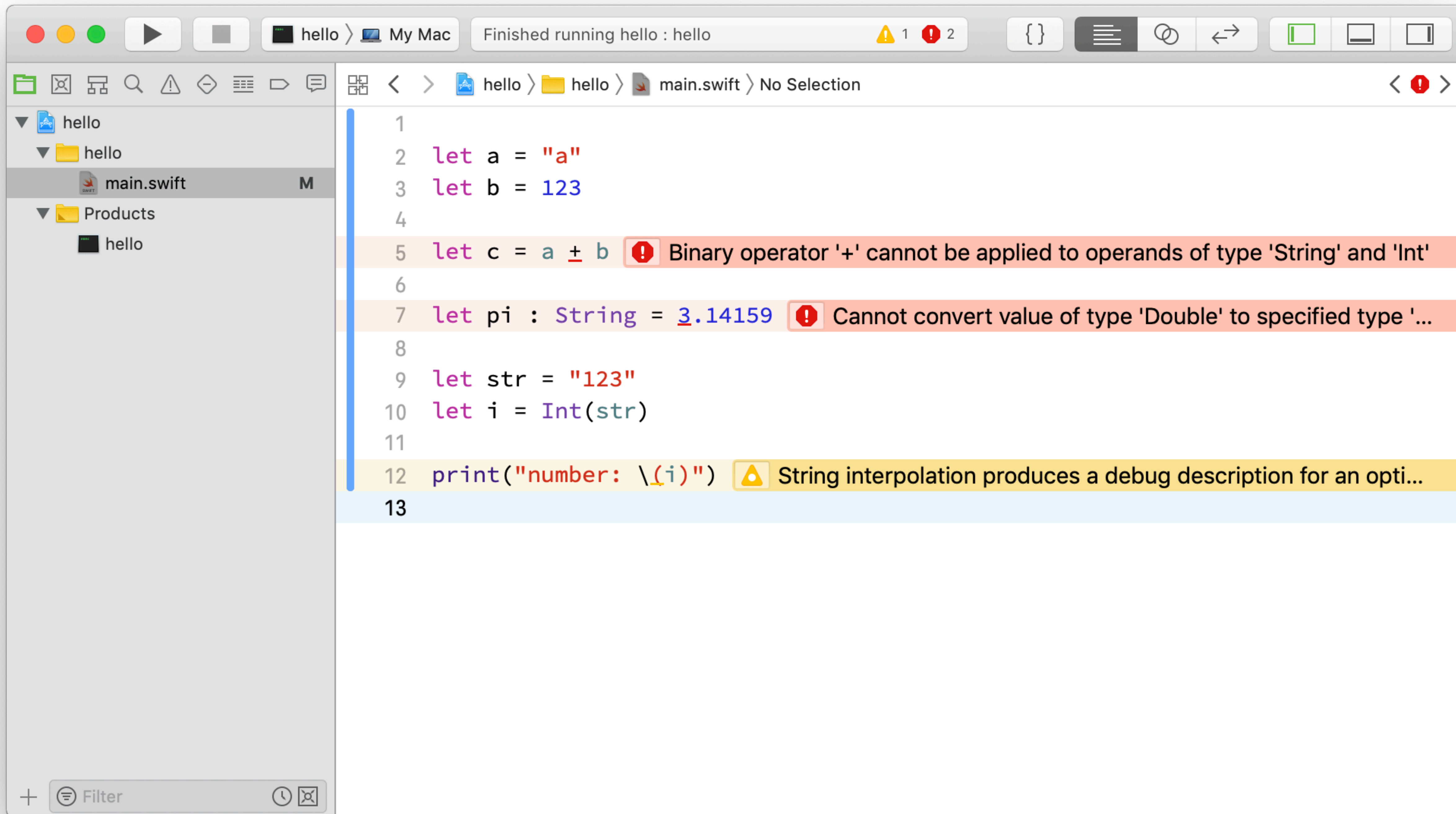
```
let a : String = "a"  
let b : Int = 2  
let c = a + b
```

 Binary operator '+' cannot be applied to operands of type

Compile-time error

Run-time error

Compile-time error



Python — Dynamic Type

```
myststring = "Hello"
```

Objective-C — Dynamic Type

```
id mystring = @"Hello";
```


Objective-C — Static Type

```
NSString *mystring = @"Hello";
```


Swift — Static Type

```
var mystring : String = "Hello"
```

Swift — Static Type

```
var mystring : String = "Hello"
```

variable: this will change!



Variable 'mystring' was never mutated; consider changing to 'let' constant

Swift — Static Type

```
let mystring : String = "Hello"
```

constant: never change!



Cannot assign to value: 'mystring' is a 'let' constant

Swift — Static Type

```
let mystring : String = "Hello"
```



Swift — Static Type

```
let mystring : String = 3.14159
```



Cannot convert value of type 'Double' to specified type 'String'

Swift — Static Type

```
let mystring : String = "Hello"
```

Swift — Inferred Type

String
let mystring = "Hello"

Swift — Inferred Type

```
let mystring = "Hello"
```

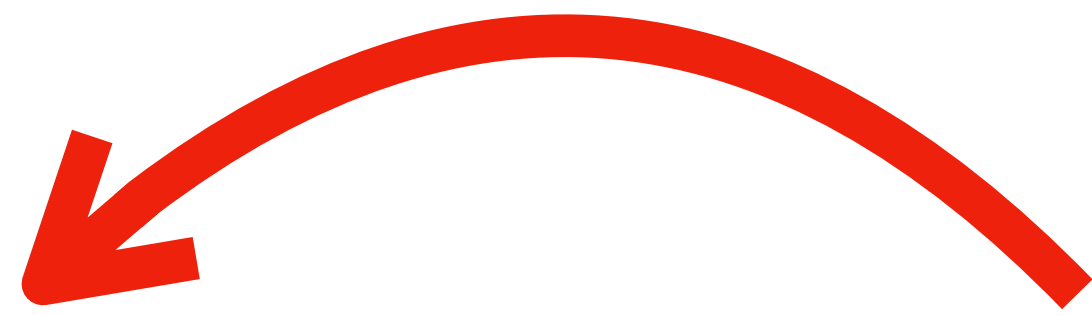
```
let pi = 3.1415
```

```
var full = "\(first) \(last)"
```

```
var tv = controller.tableView
```

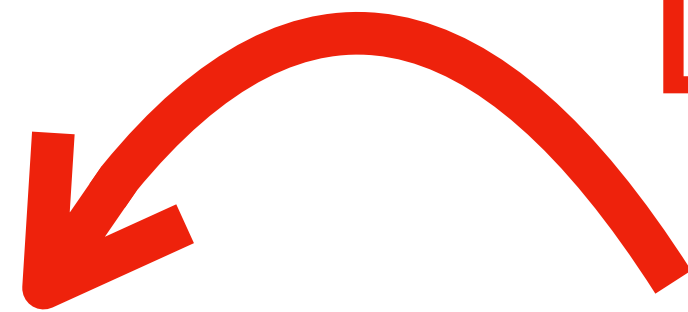

Typed Collections

Array<String>



```
let list = ["Eggs", "Milk", "Butter"]
```

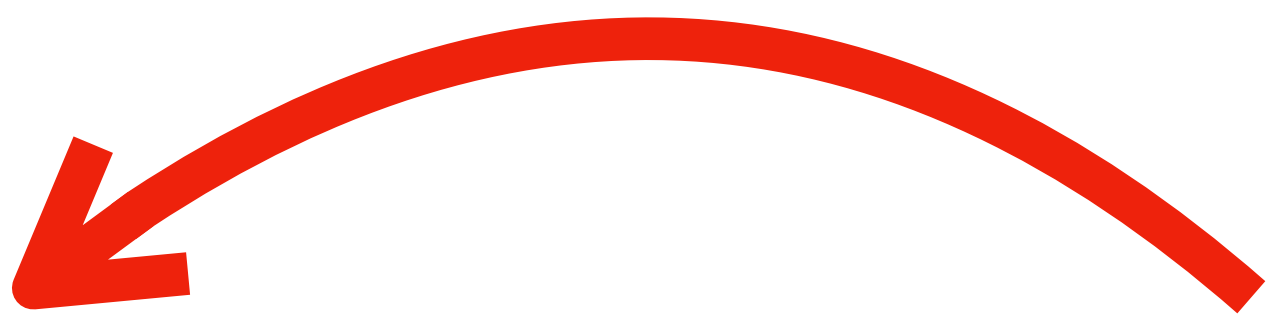
Dictionary<Int, String>



```
let dict = [1:"one", 2:"two"]
```

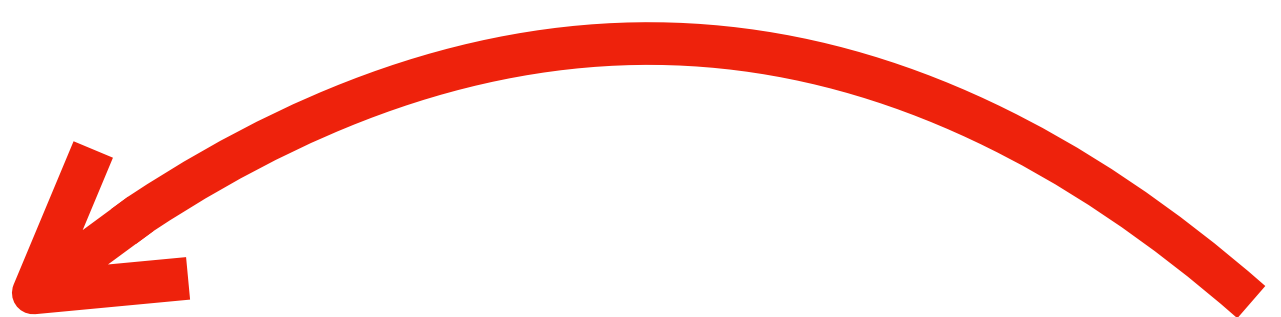
Typed Collections

[Array]



```
let list = ["Eggs", "Milk", "Butter"]
```

[Int: String]



```
let dict = [1: "one", 2: "two"]
```

Optionals


```
let i = Int(aString)
```



```
let i = Int("123")
```

→ i = 123

```
let i = Int("-1")
```

→ i = -1

```
let i = Int("0")
```

→ i = 0


```
let i = Int("hello")
```

→ i = ???


```
let i = Int("🍌")
```

→ i = ???

```
let i = Int(aString)
```

→ Int value

→ nil

Optional<Int>

```
let i = Int(aString)
```

→ Int value

→ nil

Int?

let i = Int(aString)



Int?

```
let i = Int(aString)
```

```
let n = i + 1
```

 Value of optional type 'Int?' must be unwrapped to a value of type 'Int'

Run-time error < Compile-time error

```
let i = Int(aString)
```

```
if i != nil {  
    print(i)  
} else {  
    print("can't convert")  
}
```

```
let i = Int(aString)
```

```
if i != nil {  
    print(i)  
} else {  
    print("can't convert")  
}
```



Expression implicitly coerced from 'Int?'


```
let i = Int(aString)
```

```
if i != nil {  
    print(i!)    ! 'unwraps'  
} else {  
    print("can't convert")  
}
```

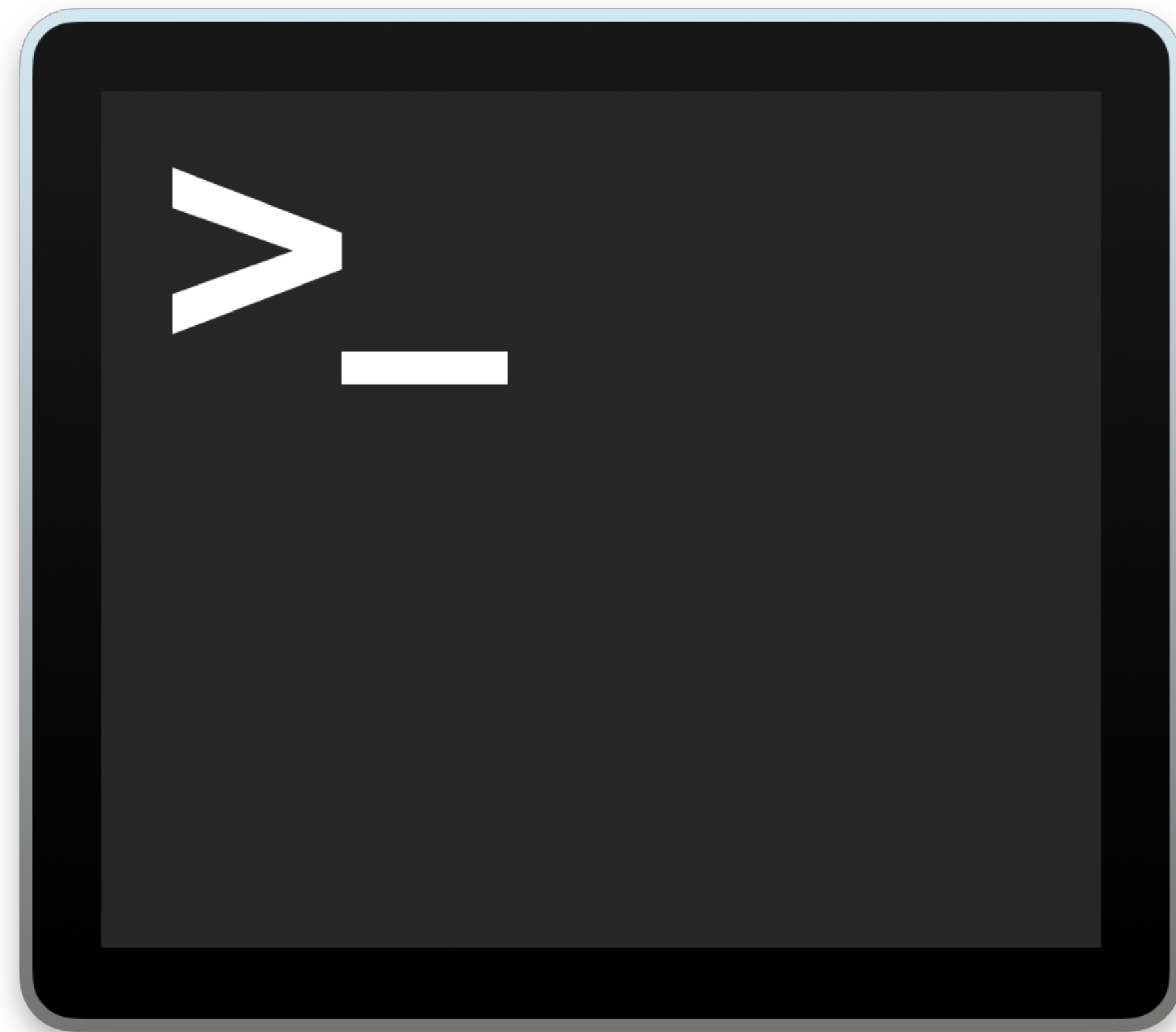
```
let i = Int(aString)
```

```
if i != nil {  
    print((i!))    ! 'crashes'   
} else {  
    print("can't convert")  
}
```


Some "Real" Projects

An Incomplete List

desktoppr



Tool to set desktop
without Apple Events

DEPNotify



DEPNotify





Register this Mac

My ID

Upper Placeholder

Asset Tag

Lower Placeholder

City

London

⌵

Lower Menu

Item 1

⌵

Register

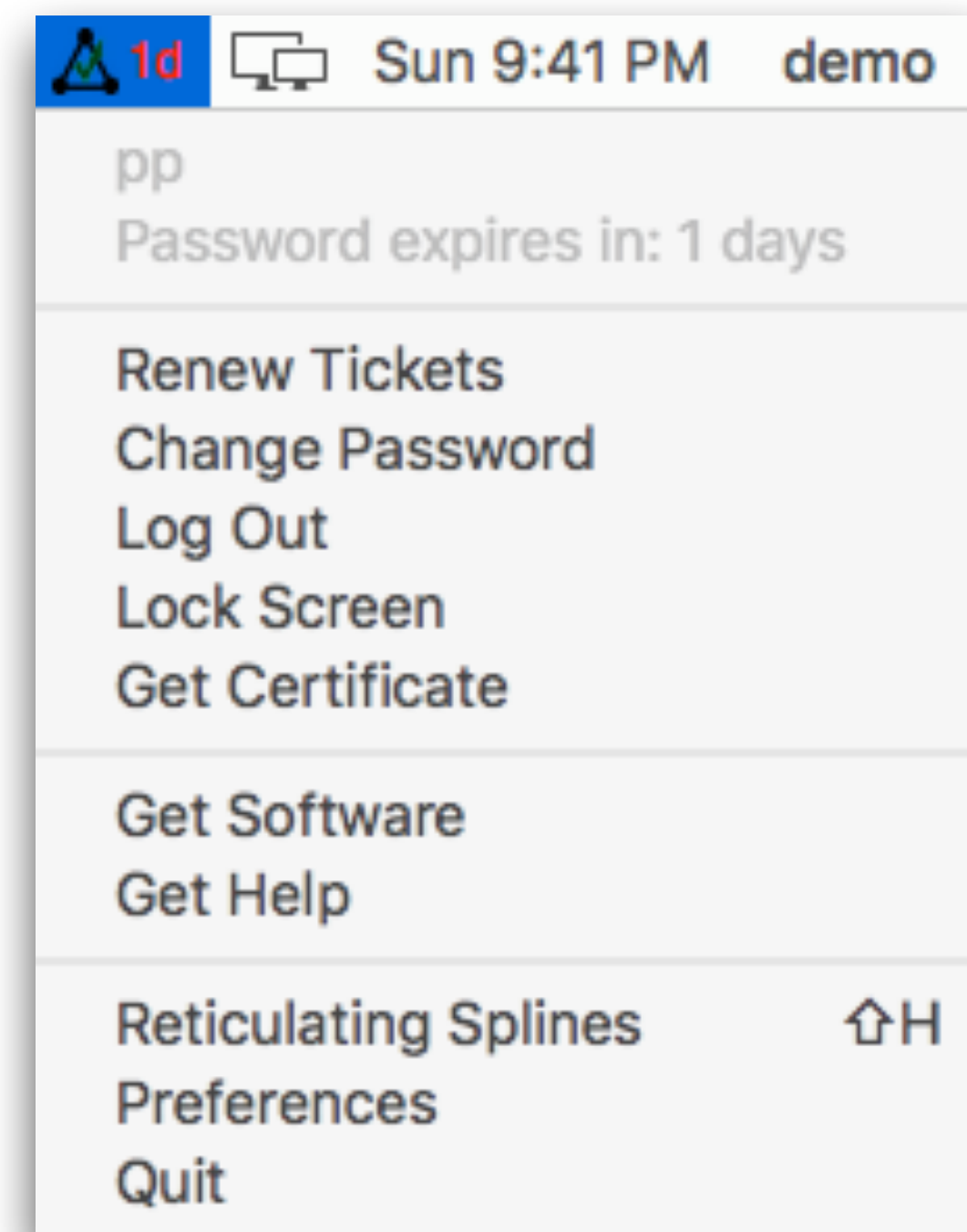
SplashBuddy



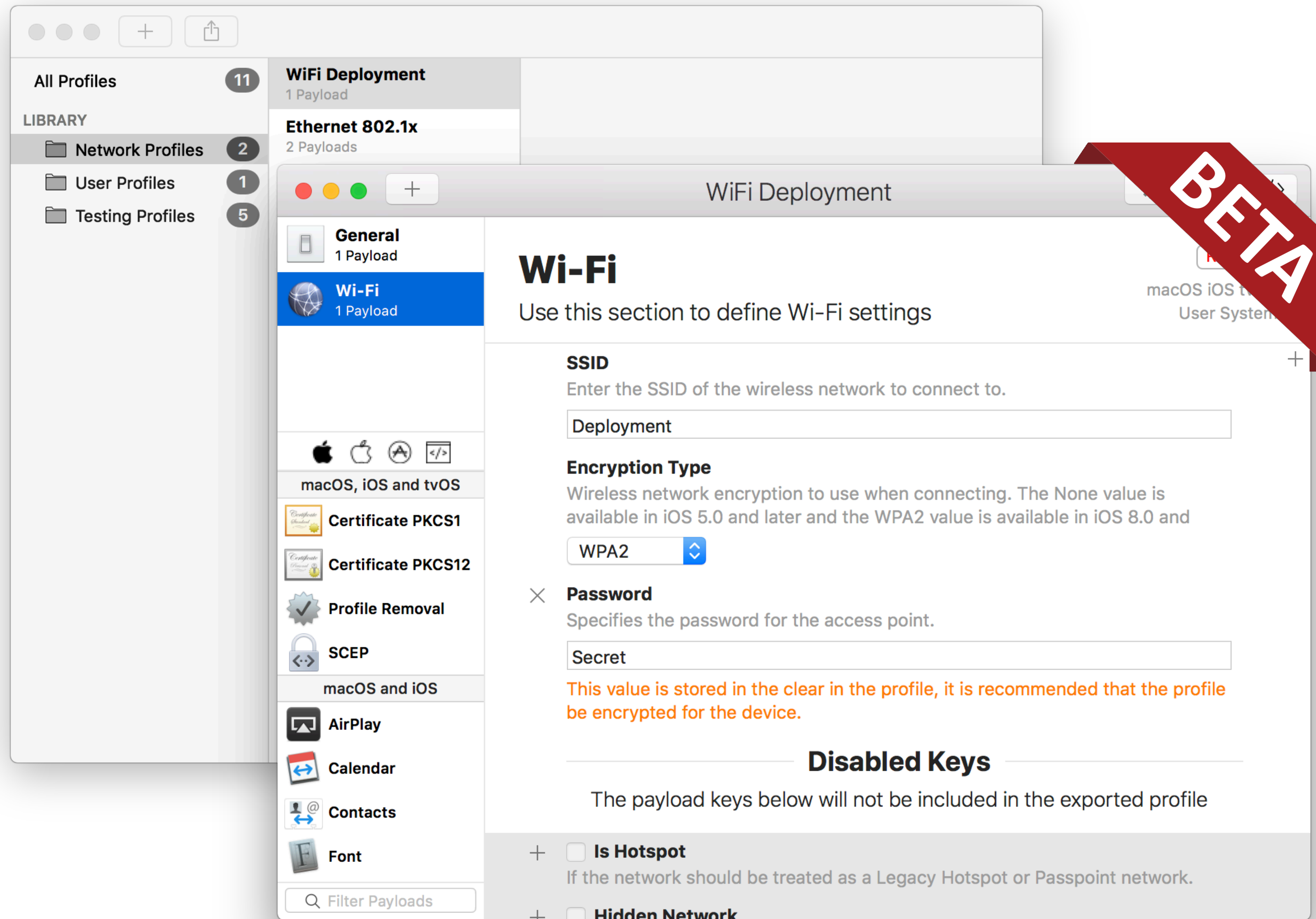
NoMAD



NoMAD

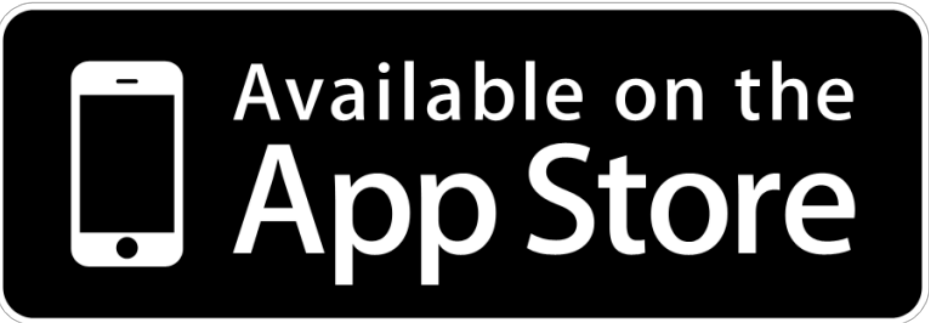


Profile Creator



jAly — iOS

Replace "Background" layer with working web page background, then resize file to final scale and Save for Web or export web file. Minimum size 40 pixels high. Preserve clear space and do not distort file proportions, per guidelines.



Carrier 1:34 PM

Clear jAly Settings

Please modify / set your JSS information by tapping Settings. Your settings are:

JSS URL:
Username:
Group ID:

Username Lookup User

Device SN Scan Lookup SN

Inventory # Scan Lookup Inv#

Full Name: Full Name
iOS Version: iOS Version
Battery %: Battery %
Free Space Free Space
Device MAC: Device MAC
Device IP: Device IP
Last Inventory: Last Inventory
Warranty Expires: Warranty Expires

Update Inventory Remove Restrictions
Send Blank Push Re-Apply Restrictions
Restart Device Shutdown Device

Carrier 1:34 PM

Clear jAly Settings

Please modify / set your JSS information by tapping Settings. Your settings are:

JSS URL:
Username:
Group ID:

ipadloaner Lookup User

Scan Lookup SN

2017383 Scan Lookup Inv#

Full Name: ipadloaner
iOS Version: 10.3.3
Battery %: 88 %
Free Space 0.75 GB
Device MAC: F4:5C:89:86:EC:6E
Device IP: 192.168.45.156
Last Inventory: Tue 10/24/17 13:27 PM
Warranty Expires: Mon 08/19/19

Update Inventory Remove Restrictions
Send Blank Push Re-Apply Restrictions
Restart Device Shutdown Device

Carrier 1:34 PM

Clear jAly Settings

Please modify / set your JSS information by tapping Settings. Your settings are:

JSS URL:
Username:
Group ID:

ipadloaner Lookup User

Scan Lookup SN

2017383 Scan Lookup Inv#

Full Name: ipadloaner
iOS Version: 10.3.3
Battery %: 88 %
Free Space 0.75 GB
Device MAC: F4:5C:89:86:EC:6E
Device IP: 192.168.45.156
Last Inventory: Tue 10/24/17 13:27 PM
Warranty Expires: Mon 08/19/19

Update Inventory Remove Restrictions
Send Blank Push Re-Apply Restrictions
Restart Device Shutdown Device

Carrier 1:34 PM

Save jAly Close

JSS URL Check

Exception Group ID 93

JSS Username JSS Password

saeksr Verify

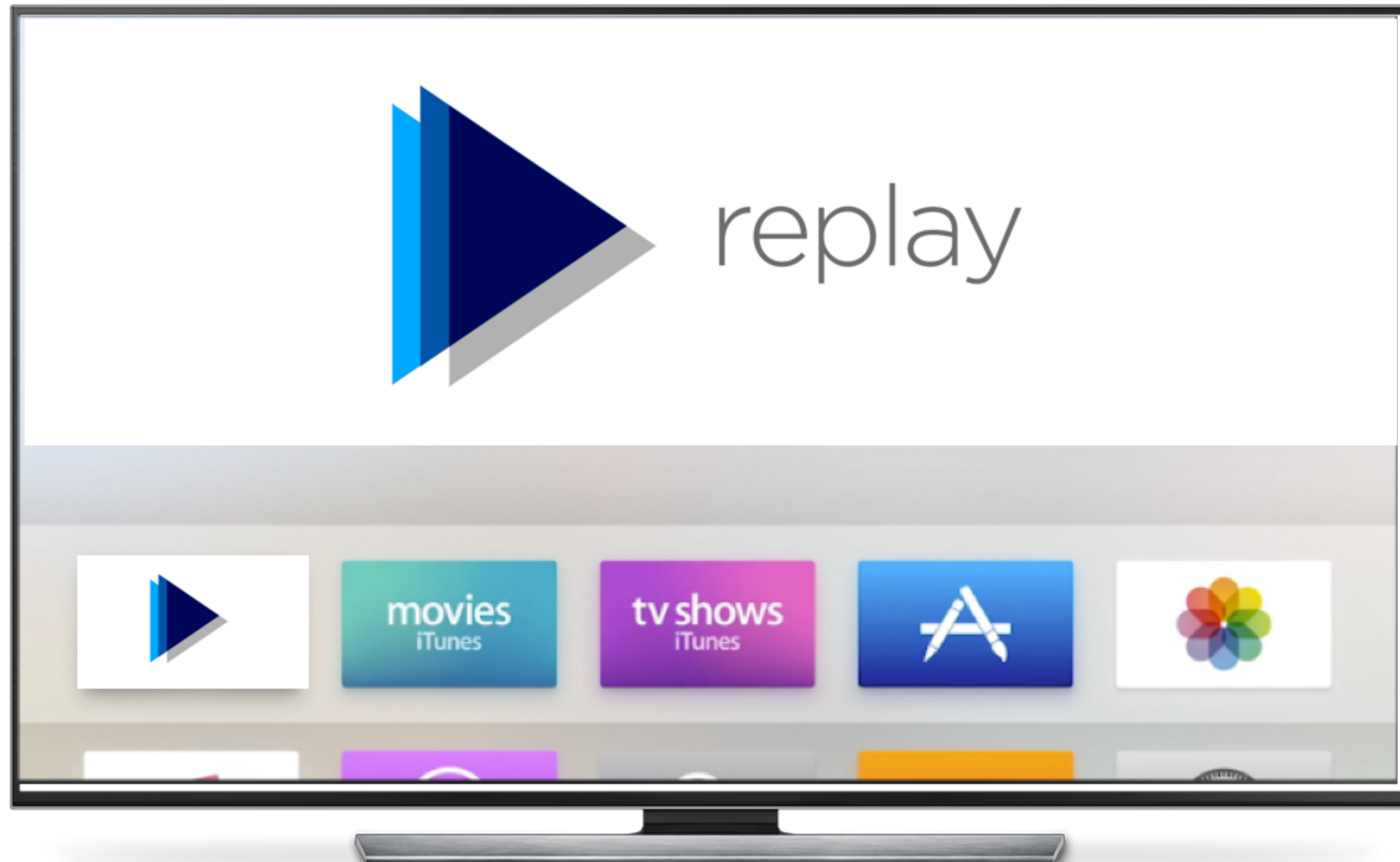
Connection Notes

Status Icon Configuration

	Battery	Used Space
Warning	20	10
Critical	5	5

Please obtain your JSS URL and exception group ID from your administrator. If using a self signed certificate, you will need to install it on this device to trust the JSS.

Replay — tvOS



One more...

Erase & Install

`startosinstall --eraseinstall`

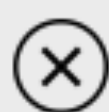


Erase & Install



This tool will erase all data on this Mac and re-install macOS to return the Mac to the factory default.

All your personal data and information will be deleted from this Mac!

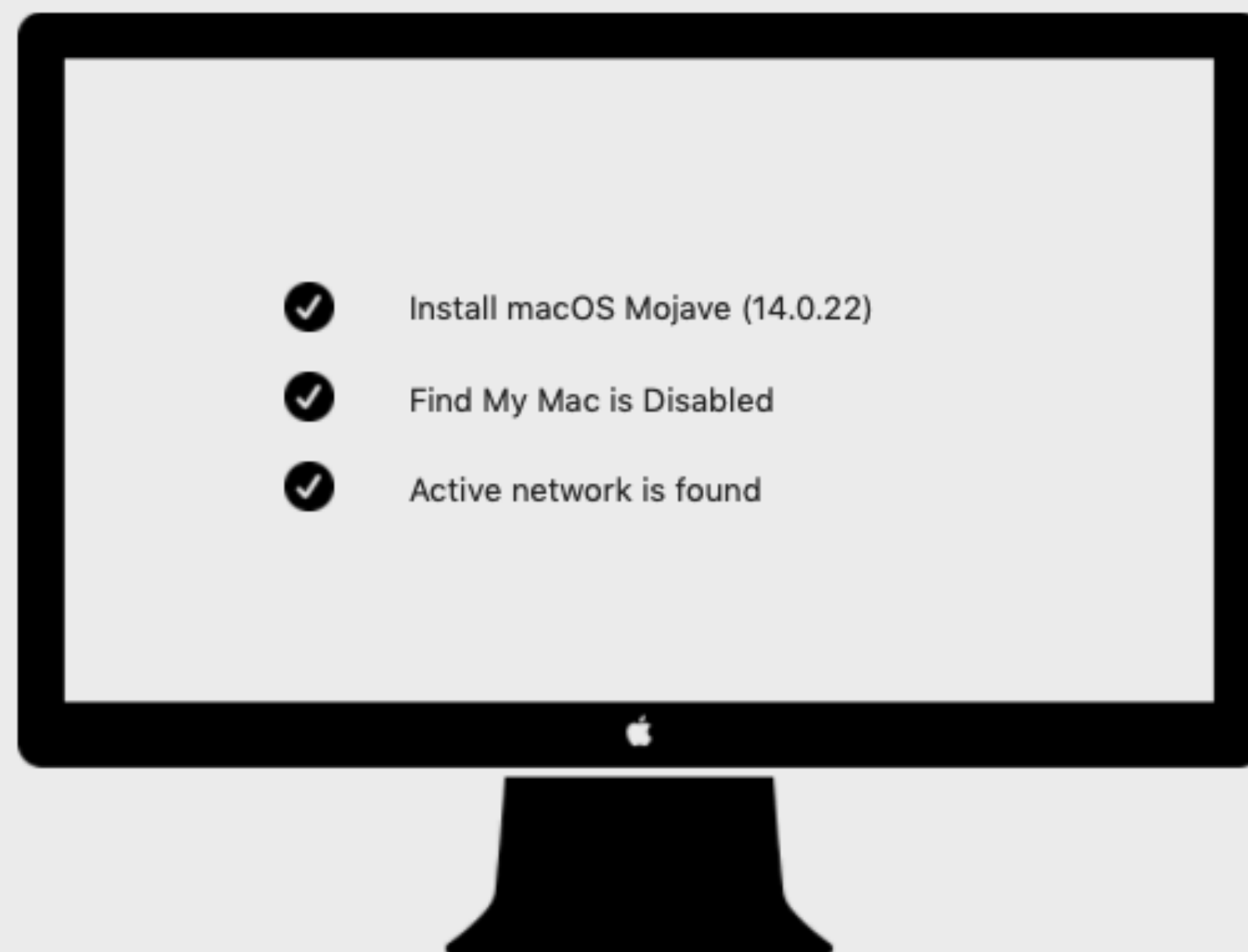


Quit

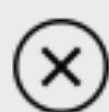


Continue

Checklist



- ✓ Install macOS Mojave (14.0.22)
- ✓ Find My Mac is Disabled
- ✓ Active network is found



Quit



Continue

Preparing for Erase & Install



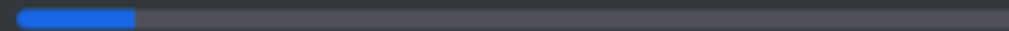
This computer is now being erased and is locked until reboot.



Preparing for Erase & Install



This computer is now being erased and is locked until reboot.



Erase & Install





Swift

for Apple Admins





AppleScript



Swift



scriptingosx.com/swift



scriptingosx.com



@scriptingosx



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