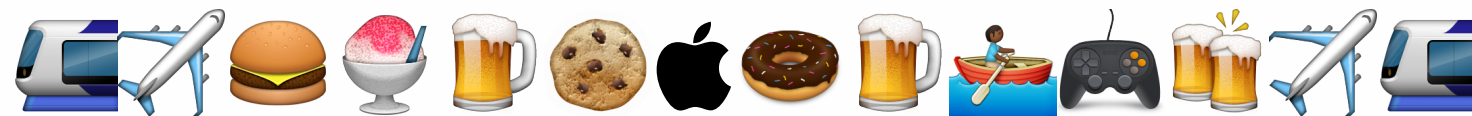




Working with System Frameworks in Python and Objective-C

by James Barclay

bit.ly/psudemo



Dude, Where's My Source Code?

CODE

<https://github.com/futureimperfect/psu-pyobjc-demo>

<https://github.com/futureimperfect/PSUDemo>

SLIDES

<https://github.com/futureimperfect/slides>



Agenda

1. What are system frameworks, and why should you care?
2. Brief overview of the frameworks, classes, and APIs that will be demonstrated.
3. Demo 1: PyObjC
4. Demo 2: Objective-C
5. Wrap up and questions.

```

1  /* Foundation.h
2  Copyright (c) 1994-2014, Apple Inc. All rights reserved.
3  */
4
5
6  #include <CoreFoundation/CoreFoundation.h>
7
8  #import <Foundation/NSObjCRuntime.h>
9
10 #import <Foundation/NSArray.h>
11 #import <Foundation/NSAutoreleasePool.h>
12 #import <Foundation/NSBundle.h>
13 #import <Foundation/NSByteOrder.h>
14 #import <Foundation/NSCalendar.h>
15 #import <Foundation/NSCharacterSet.h>
16 #import <Foundation/NSCoder.h>
17 #import <Foundation/NSData.h>
18 #import <Foundation/NSDate.h>
19 #import <Foundation/NSDateFormatter.h>
20 #import <Foundation/NSDateIntervalFormatter.h>
21 #import <Foundation/NSMassFormatter.h>
22 #import <Foundation/NSLengthFormatter.h>
23 #import <Foundation/NSEnergyFormatter.h>
24 #import <Foundation/NSDecimal.h>
25 #import <Foundation/NSDecimalNumber.h>
26 #import <Foundation/NSDictionary.h>
27 #import <Foundation/NSEnumerator.h>
28 #import <Foundation/NSError.h>
29 #import <Foundation/NSException.h>
30 #import <Foundation/NSFileHandle.h>
31 #import <Foundation/NSFileManager.h>
32 #import <Foundation/NSFormatter.h>
33 #import <Foundation/NSHashTable.h>
34 #import <Foundation/NSHTTPCookie.h>
35 #import <Foundation/NSHTTPCookieStorage.h>
36 #import <Foundation/NSIndexPath.h>
37 #import <Foundation/NSIndexSet.h>
38 #import <Foundation/NSInvocation.h>
39 #import <Foundation/NSJSONSerialization.h>
40 #import <Foundation/NSKeyValueCoding.h>
41 #import <Foundation/NSKeyValueObserving.h>
42 #import <Foundation/NSKeyedArchiver.h>
43 #import <Foundation/NSLocale.h>
44 #import <Foundation/NSLock.h>
45 #import <Foundation/NSMapTable.h>
46 #import <Foundation/NSMethodSignature.h>
47 #import <Foundation/NSNotification.h>
48 #import <Foundation/NSNotificationQueue.h>
49 #import <Foundation/NSNull.h>
50 #import <Foundation/NSNumberFormatter.h>
51 #import <Foundation/NSObject.h>
52 #import <Foundation/NSOperation.h>
53 #import <Foundation/NSOrderedSet.h>
54 #import <Foundation/NSOrthography.h>
55 #import <Foundation/NSPathUtilities.h>
56 #import <Foundation/NSPointerArray.h>
57 #import <Foundation/NSPointerFunctions.h>

```

Frameworks, Classes, and APIs oh my!

Cocoa

- Foundation
 - NSFileManager
 - NSTask
 - NSURLSession
 - NSUserDefaults
- AppKit
 - NSApplication

CoreFoundation

- CFPReferences

CoreGraphics

- Quartz

Quartz is a graphics layer that is often used synonymously with CoreGraphics. We won't be going into depth on this, just showing how to get the current system display state in Python.

This is the obligatory slide showing all the things we'll be talking about and using during this presentation.

```
vim
1  /* CoreFoundation.h
2   Copyright (c) 1998-2014, Apple Inc. All rights reserved.
3   */
4
5  #if !defined(__COREFOUNDATION_COREFOUNDATION__)
6  #define __COREFOUNDATION_COREFOUNDATION__ 1
7  #define __COREFOUNDATION__ 1
8
9  #if !defined(CF_EXCLUDE_CSTD_HEADERS)
10
11  #include <sys/types.h>
12  #include <stdarg.h>
13  #include <assert.h>
14  #include <ctype.h>
15  #include <errno.h>
16  #include <float.h>
17  #include <limits.h>
18  #include <locale.h>
19  #include <math.h>
20  #include <setjmp.h>
21  #include <signal.h>
22  #include <stddef.h>
23  #include <stdio.h>
24  #include <stdlib.h>
25  #include <string.h>
26  #include <time.h>
27
28  #if defined(__STDC_VERSION__) && (199901L <= __STDC_VERSION__)
29
30  #include <inttypes.h>
31  #include <stdbool.h>
32  #include <stdint.h>
33
34  #endif
35
36  #endif
37
38  #include <CoreFoundation/CFBase.h>
39  #include <CoreFoundation/CFArray.h>
40  #include <CoreFoundation/CFBag.h>
41  #include <CoreFoundation/CFBinaryHeap.h>
42  #include <CoreFoundation/CFBitVector.h>
43  #include <CoreFoundation/CFByteOrder.h>
44  #include <CoreFoundation/CFCalendar.h>
45  #include <CoreFoundation/CFCharacterSet.h>
46  #include <CoreFoundation/CFData.h>
47  #include <CoreFoundation/CFDate.h>
48  #include <CoreFoundation/CFDateFormatter.h>
49  #include <CoreFoundation/CFDictionary.h>
50  #include <CoreFoundation/CFError.h>
51  #include <CoreFoundation/CFLocale.h>
52  #include <CoreFoundation/CFNumber.h>
53  #include <CoreFoundation/CFNumberFormatter.h>
54  #include <CoreFoundation/CFPreferences.h>
55  #include <CoreFoundation/CFPropertyList.h>
56  #include <CoreFoundation/CFSet.h>
57  #include <CoreFoundation/CFString.h>
58  #include <CoreFoundation/CFStringEncodingExt.h>
59  #include <CoreFoundation/CFTimeZone.h>
60  #include <CoreFoundation/CFTree.h>
61  #include <CoreFoundation/CFURL.h>
62  #include <CoreFoundation/CFURLAccess.h>
63  #include <CoreFoundation/CFUUID.h>
64  #include <CoreFoundation/CFUtilities.h>
65
66  #if (TARGET_OS_MAC && !(TARGET_OS_EMBEDDED || TARGET_OS_IPHONE)) || (TARGET_OS_EMBEDDED || TARGET_OS_IPHONE) || TARGET_OS_SIMULATOR
67  #include <CoreFoundation/CFBundle.h>
68  #include <CoreFoundation/CFMessagePort.h>
69  #include <CoreFoundation/CFPlugIn.h>
70  #include <CoreFoundation/CFRunLoop.h>
71  #include <CoreFoundation/CFStream.h>
72  #include <CoreFoundation/CFSocket.h>
73
74  #ifndef CF_OPEN_SOURCE
75  #include <CoreFoundation/CFAttributedString.h>
76  #include <CoreFoundation/CFNotificationCenter.h>
77  #include <CoreFoundation/CFURLEnumerator.h>
78  #endif
79
80  #endif
81
82  #if (TARGET_OS_MAC && !(TARGET_OS_EMBEDDED || TARGET_OS_IPHONE)) || (TARGET_OS_EMBEDDED || TARGET_OS_IPHONE) || TARGET_OS_SIMULATOR
83  #ifndef CF_OPEN_SOURCE
84  #include <CoreFoundation/CFFileSecurity.h>
85  #include <CoreFoundation/CFMachPort.h>
86  #include <CoreFoundation/CFStringTokenizer.h>
87  #include <CoreFoundation/CFFileDescriptor.h>
88  #endif
89  #endif
90
91  #if (TARGET_OS_MAC && !(TARGET_OS_EMBEDDED || TARGET_OS_IPHONE))
92  #include <CoreFoundation/CFUserNotification.h>
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PyObjC

colons -> underscores

Pros

- Allows Python programmers to take advantage of OS X system toolkits.
- Python is powerful and easy to pick up.

Cons

- Probably fewer answers on Stack Overflow.
- Can be awkward to use.
 - All colons following selectors are replaced with underscores, which can make the intent more ambiguous.
 - `[myCar refuelWith:gas replaceCap:@YES];`
 - `myCar.refuelWith_replaceCap_(gas, True)`



Demo 1

System Frameworks in Python

Quartz

```
def is_computer_locked():  
    d = Quartz.CGSessionCopyCurrentDictionary()  
    if d.get('kCGSSessionOnConsoleKey') is False or d.get(  
        'CGSSessionScreenIsLocked') is True:  
        return True  
    return False
```

NSWorkspace and NSApplication

```
def block_user():  
    ws = NSWorkspace.sharedWorkspace()  
    ws.hideOtherApplications()  
    # OR'ing the desired options yields the correct result.  
    options = NSApplicationPresentationHideDock | \  
              NSApplicationPresentationDisableProcessSwitching | \  
              NSApplicationPresentationDisableForceQuit | \  
              NSApplicationPresentationDisableSessionTermination  
    NSApp().setPresentationOptions_(options)  
  
def unblock_user():  
    options = NSApplicationPresentationDefault  
    NSApp().setPresentationOptions_(options)
```

CFPreferences(Copy|Set)AppValue

```
def get_pref_val(key, domain):  
    val = CFPreferencesCopyAppValue(key, domain)  
    return val
```

```
def set_pref_val(key, data, domain):  
    CFPreferencesSetAppValue(key, data, domain)  
    CFPreferencesAppSynchronize(domain)
```

CFPreferencesAppValueIsForced

```
# Check if the 'askForPassword' preference is managed.  
ask_for_password_managed = CFPreferencesAppValueIsForced(  
    'askForPassword',  
    'com.apple.screensaver'  
)  
print_color(  
    'Managing the screensaver askForPassword preference:'  
)  
print('\t%s' % ask_for_password_managed)
```

NSWorkspace

```
def get_running_apps():  
    ws = NSWorkspace.sharedWorkspace()  
    running_apps = ws.runningApplications()  
    apps = []  
    for app in running_apps:  
        apps.append(app.localizedName())  
    apps = set(apps)  
  
    return apps
```




You're going to love this if you have a thing for square brackets and ridiculously long method names, (e.g., `dateWithTimeIntervalSince1970`).

Demo 2

System Frameworks in Objective-C

What We Covered

Basic usage of CFPreferences, AppKit, and Quartz in Python.

- How to retrieve and set preference values.
- How to determine if an application preference value is forced.
- How to access the kiosk mode APIs and set presentation options.
- How to determine if a Mac's screen is locked or if a console user is logged in.

Basic usage of NSTask, NSURLSession, NSUserDefaults, etc.

- How to make a cow app.

References

- <https://developer.apple.com/library/mac/documentation/CoreFoundation/Conceptual/CFPreferences/Concepts/BestPractices.html>
- <https://developer.apple.com/library/mac/documentation/CoreFoundation/Reference/CFPreferencesUtils/>
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Questions?

So Long, and Thanks for All the Cows