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Packaging Your JavaFX Apps for the Mac and the Mac App Store

CON2228

CREATE THE FUTURE

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October 1, 2014

Safe Harbor Statement

Packaging Your JavaFX Apps for the Mac and the Mac App Store

1 Building your Application

2 Polishing your Application

3 Securing your Application

4 Submitting your Application

5 JSR-208 and 8u40

Packaging Your JavaFX Apps for the Mac and the Mac App Store

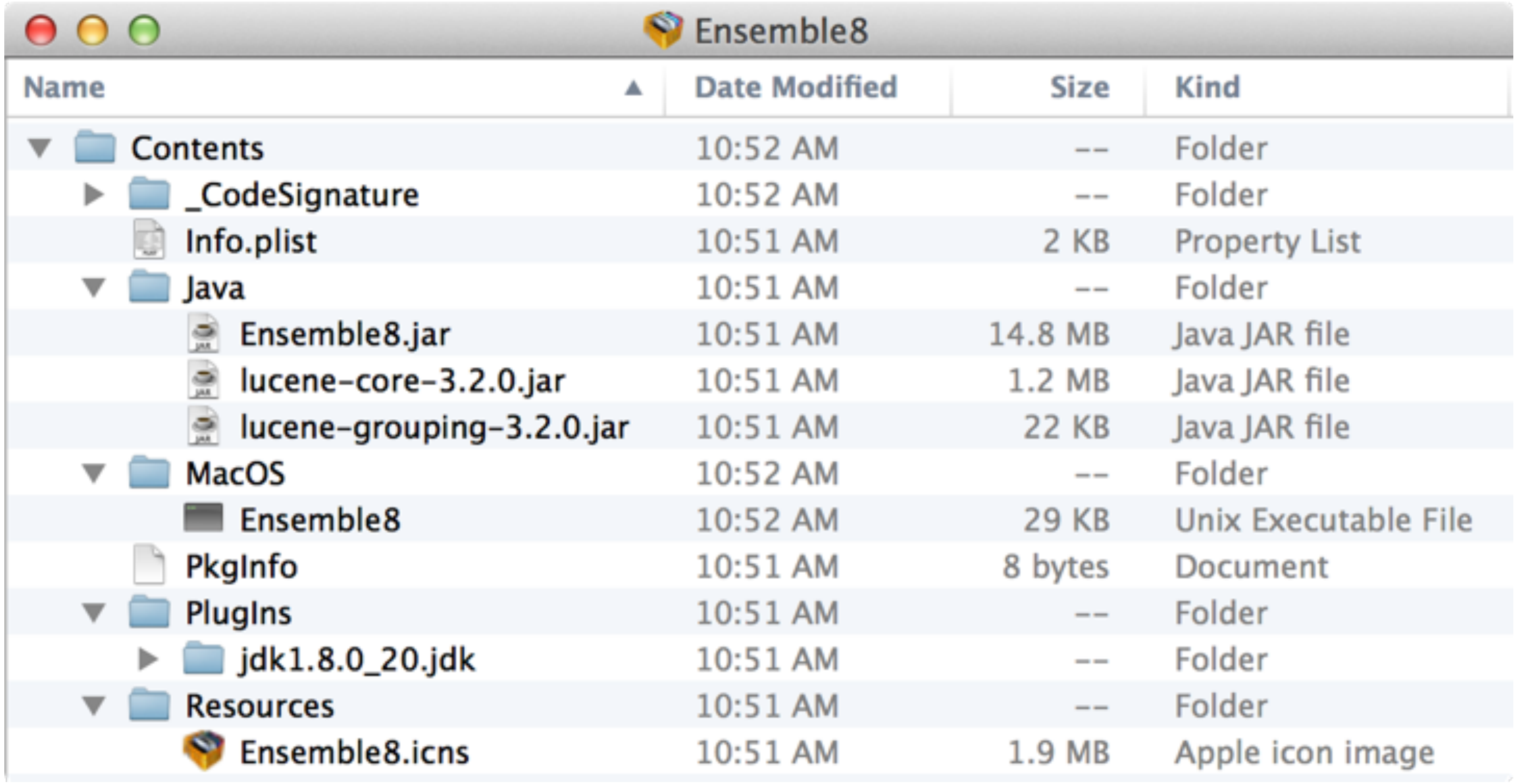
Mac Packaging Options

- .app - Directory layout
  - This is the golden standard
  - Integrates with Finder
- .dmg - Disk Image
  - Basically and advanced .iso file, Contains the .app directory
  - Shortcut to /Applications for “drag to install” experience
- .pkg - Wizard like installer
  - Copies the .app from its archive
  - Allows for install hooks

A Short History of the .app Bundle

- Originally started as a bit on the Old World Mac OS (8.6.1)
    - Told Finder to show Directory as one file
    - Applications had a specific structure
- OS X (10.0) migrated the internal bundle format to NextSTEP standards

.app - Application Directory Layout



Ensemble8

Name	Date Modified	Size	Kind
▼ Contents	10:52 AM	--	Folder
▶ _CodeSignature	10:52 AM	--	Folder
Info.plist	10:51 AM	2 KB	Property List
▼ Java	10:51 AM	--	Folder
Ensemble8.jar	10:51 AM	14.8 MB	Java JAR file
lucene-core-3.2.0.jar	10:51 AM	1.2 MB	Java JAR file
lucene-grouping-3.2.0.jar	10:51 AM	22 KB	Java JAR file
▼ MacOS	10:52 AM	--	Folder
Ensemble8	10:52 AM	29 KB	Unix Executable File
PkgInfo	10:51 AM	8 bytes	Document
▼ PlugIns	10:51 AM	--	Folder
▶ jdk1.8.0_20.jdk	10:51 AM	--	Folder
▼ Resources	10:51 AM	--	Folder
Ensemble8.icns	10:51 AM	1.9 MB	Apple icon image

What goes in .../Contents/Java?

- All your Jars
- All your media assets
- Native Libraries
  - **`java.library.path`** is set to ...**`/Contents/Java`**
  - Be sure to follow the naming convention:
    `lib`<library name>**`.dylib`**
    e.g. **`libpackager.dylib`** for **`System.loadLibary("packager")`**
- All other data files
- Basically everything goes in here

.app Recommendations

- Bring your own JVM

  You can rely on the System JVM, but it may not be there and it may not be the right version.

  Bringing your own shields you from these complications.

- Bring all your own jars

  Places to stash downloaded content get weird.
  These apps should be self-contained.

Packaged Formats

- .dmg - Disk Image
  - Classic “drag to install” file format
  - Can hang your automated build server when creating

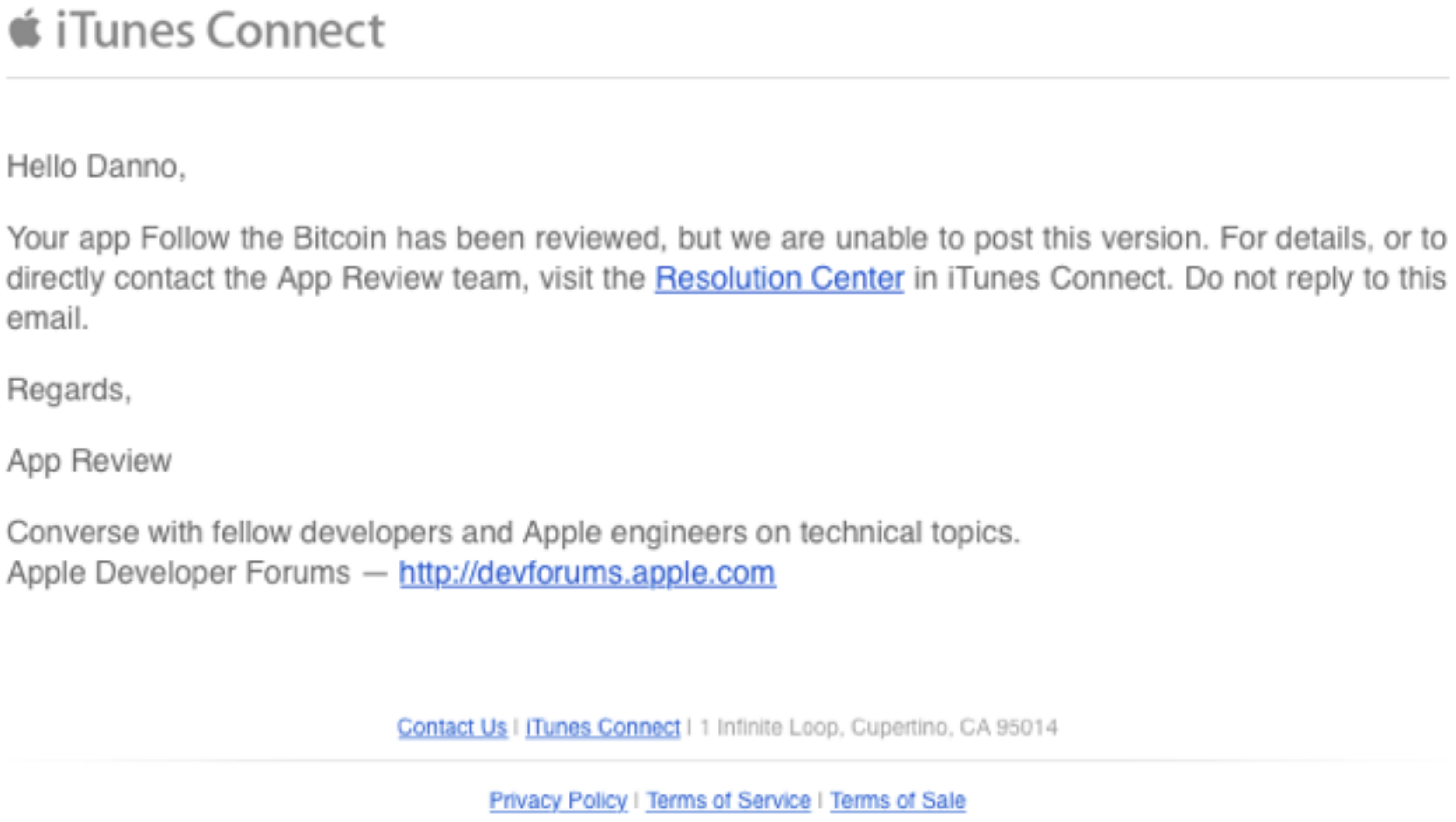
- .pkg - package installer
  - Classic “wizard” style installer
  - Allows for script execution at install

Java Packager (Ships with the JDK)

- Java packager creates these bundles:
  - .app file
  - .dmg file, using .app from above
  - .pkg file, using .app from above
  - .pkg file ready for Mac App Store submission, with the .app from above
    - Signed properly
    - Deprecated libraries stripped out

Packaging Your JavaFX Apps for the Mac and the Mac App Store

Polishing your App



iTunes Connect

Hello Danno,

Your app Follow the Bitcoin has been reviewed, but we are unable to post this version. For details, or to directly contact the App Review team, visit the Resolution Center in iTunes Connect. Do not reply to this email.

Regards,

App Review

Converse with fellow developers and Apple engineers on technical topics.
Apple Developer Forums — http://devforums.apple.com

Contact Us | iTunes Connect | 1 Infinite Loop, Cupertino, CA 95014

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Menu Bar

- Use the System Menu Bar
  - Don’t put one in your app frame
  - You can dodge this by making it a toolbar

Swing

```
System.setProperty("com.apple.macos.useScreenMenuBar", "true")
```

JavaFX

```
myMenuBar.setUseSystemMenuBar(true)
```

AWT

- Nothing, it’s automatic

Menu Bar

- Use Correct Shortcut Keys
  - Using Control or Alt as Keyboard Accelerators is bad on Mac

Swing

```
JMenuItem jmi = new JMenuItem("Copy");
jmi.setAccelerator(KeyStroke.getKeyStroke(KeyEvent.VK_C,
   Toolkit.getDefaultToolkit().getMenuShortcutKeyMask()));
```

For JavaFX, use the `SHORTCUT` modifier

- Maps to Alt on Win/Linux, ⌘ on Mac

Use the Apple Menu

- Names in the Apple Menu must match the Application Name
  - A proper plist should set this for you.
- Functions in the Apple Menu should not appear in other menus
  - Quit
  - About
  - Preferences/Settings

Lots of Apple Integration

- `com.apple.eawt` package is available in the Oracle JDK
  - Respond to System/screen wake/sleep/about to sleep events
  - Respond to user login/logout
  - Respond to Application hidden/shown/foreground/background/reopen
  - Respond to file association events/print requests
  - Respond to App Menu Events

  - Very good cheat sheet: http://moomoohk.github.io/snippets/java_osx.html

Using The Apple Menu and Finder Integration - Code

```
import com.apple.eawt.*;

// Respond to Application Menu actions
Application.getApplication().setAboutHandler(e -> ...);
Application.getApplication().setPreferencesHandler(e -> ...);
Application.getApplication().setQuitHandler(e -> ...);

// one of these quit strategies
Application.getApplication().setQuitStrategy(QuitStrategy.CLOSE_ALL_WINDOWS);
Application.getApplication().setQuitStrategy(QuitStrategy.SYSTEM_EXIT_0);

// set a Menu Bar to show when no windows exist
Application.setDefaultMenuBar(jMenuBarInstance);
```

Use a Dock Icon

- Icon should have at least a 512x512@2x version
  - i.e. 1024x1024
  - For reals, not a zoomed 32x32 icon

- This is usually specified in the Info.plist
  - No need to use custom properties/code

Don’t use Deprecated APIs

- Specifically, Quicktime and QTKit
  - JavaFX Media as of 2.2 (7u6) uses QTKit :(
  - 8u40 will also support AVFoundation for JavaFX Media
  - QTKit support in 8u40 lives in **`libjfxmedia_qtkit.dylib`**

- To fix, Remove the dylibs

  ```
  Contents/PlugIns/jdk1.8.0_40/jre/lib/libjfxmedia_qtkit.dylib
  Contents/PlugIns/jdk1.8.0_20/jre/lib/libjfxmedia.dylib
  ```

  - JavaPackager handles this automatically

Look and Feel

- Swing
  - Be careful using Aqua Look and Feel once Yosemite ships
  - Nimbus works

- JavaFX/AWT/SWT
  - You should be fine on this one for look
  - Feel may get you on some controls
    - But they hardly ever test that deeply

Golden Rule of Reviewers

- Reviewers are people, people make mistakes.
  - Some reviewers inappropriately reject apps.
  - Some reviewers inappropriately accept apps.
- What you were tagged with/got away with last time may not happen again.

And thirdly, the [pirate's] code is more what you'd call "guidelines" than actual rules. Welcome aboard the Black Pearl, Miss Turner.

—Captain Barbossa, Pirates of the Caribbean "Dead Man's Chest"

Packaging Your JavaFX Apps for the Mac and the Mac App Store

Sandboxing and Signatures

- Sign your applications to avoid gatekeeper denials
  - CLI tool is ‘`codesign`’
- Gatekeeper does not required the sandbox
  - But you can if you want
- Mac App Store does require signing and sandboxing

What does the Sandbox do?

- Limits access to exploitable system resources
  - Files
  - Network access
  - Hardware (camera, microphone, printing, etc…)
  - Access other Apps (Address Book, Calendar, etc…)
- Allows you to request access to these resources
  - Entitlements list
  - Some things are still prohibited (access to /tmp, formatting root, etc)

Entitlements

- An entitlements plist is used as part of the signing process and embedded as part of the signature
- Specifying the entitlements file
  - Mac CLI: `codesign -s “3rd Party Mac Developer Application:”     \`
    `--entitlements sample.entitlements` ...rest of cli...
  - java bundler provides two options
    - Add entitlements file to the classpath at `package/macosx/`<app name>`.entitlements`
    - Set the bundler argument ‘`mac.app-store-entitlements`’ to the file location of the entitlements

Some Useful Entitlement Keys

https://developer.apple.com/library/mac/documentation/Miscellaneous/Reference/EntitlementKeyReference/Chapters/EnablingAppSandbox.html

- Turn on sandboxing

```
com.apple.security.app-sandbox
```

- Network Access

```
com.apple.security.network.client
com.apple.security.network.server
```

- Printer access

```
com.apple.security.print
```

- File Access

```
com.apple.security.files.user-selected.read-write
com.apple.security.files.user-selected.read-only
com.apple.security.files.downloads.read-write
… and so on and so on
```

Sandbox Container

Sandbox Applications run in their own file system

- Home directory is different:
  - Something like ‘`~/Library/Containers/`<app ID>`/`‘
  - Is the value of the system property ‘`user.home`’
- No access to `/tmp`
  - Use Java APIs to get temporary directories

Signing Identities

- Apple Developer Center issues members 4 kinds of certificates
  - **`Developer ID Application`**
    - For signing non-App Store .app files
  - **`Developer ID Installer`**
    - For signing non-App Store .pkg packages
  - **`3rd Party Mac Developer Application`** / **`3rd Party Mac Developer Installer`**
    - Both for App Store Signing
  - If you import these as Apple provides them, Java packager will automatically sign your Mac apps with the right key.

Signing your Application

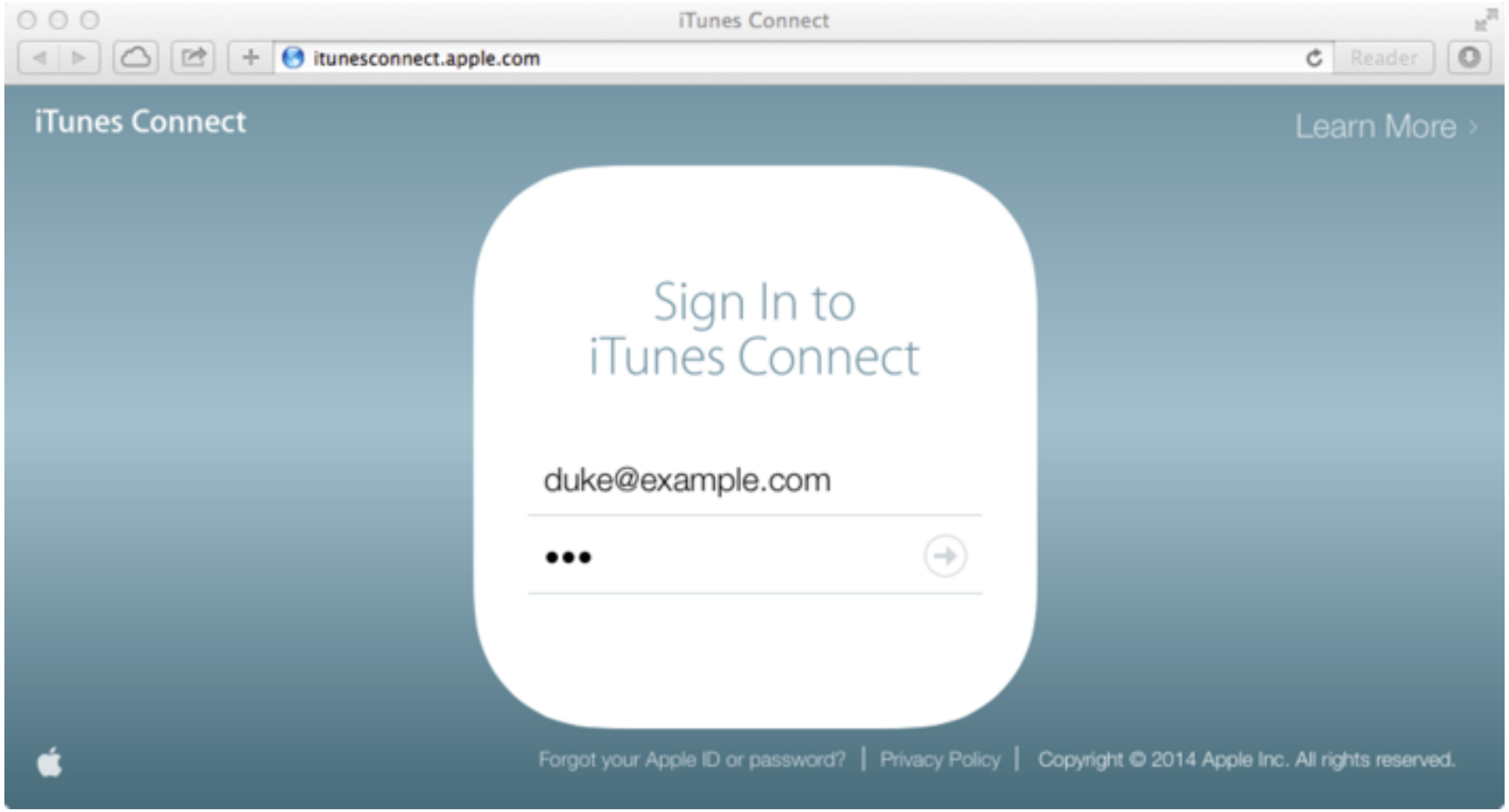
- Java packager handles it for you automatically
- If you sign by hand, do this (and in this order)
  - Sign all jars, dylibs, and executables in the .app directories
    - Except what is in …**`/Contents/MacOS`**
    - Java packager uses an ‘inherit’ entitlements file
  - Sign Packaged Java directory in …**`/Contents/Plugins/`**<jdk name>
    - Java packager uses an ‘inherit’ entitlements file
  - Sign the .app directory
    - Use your real entitlements at this point

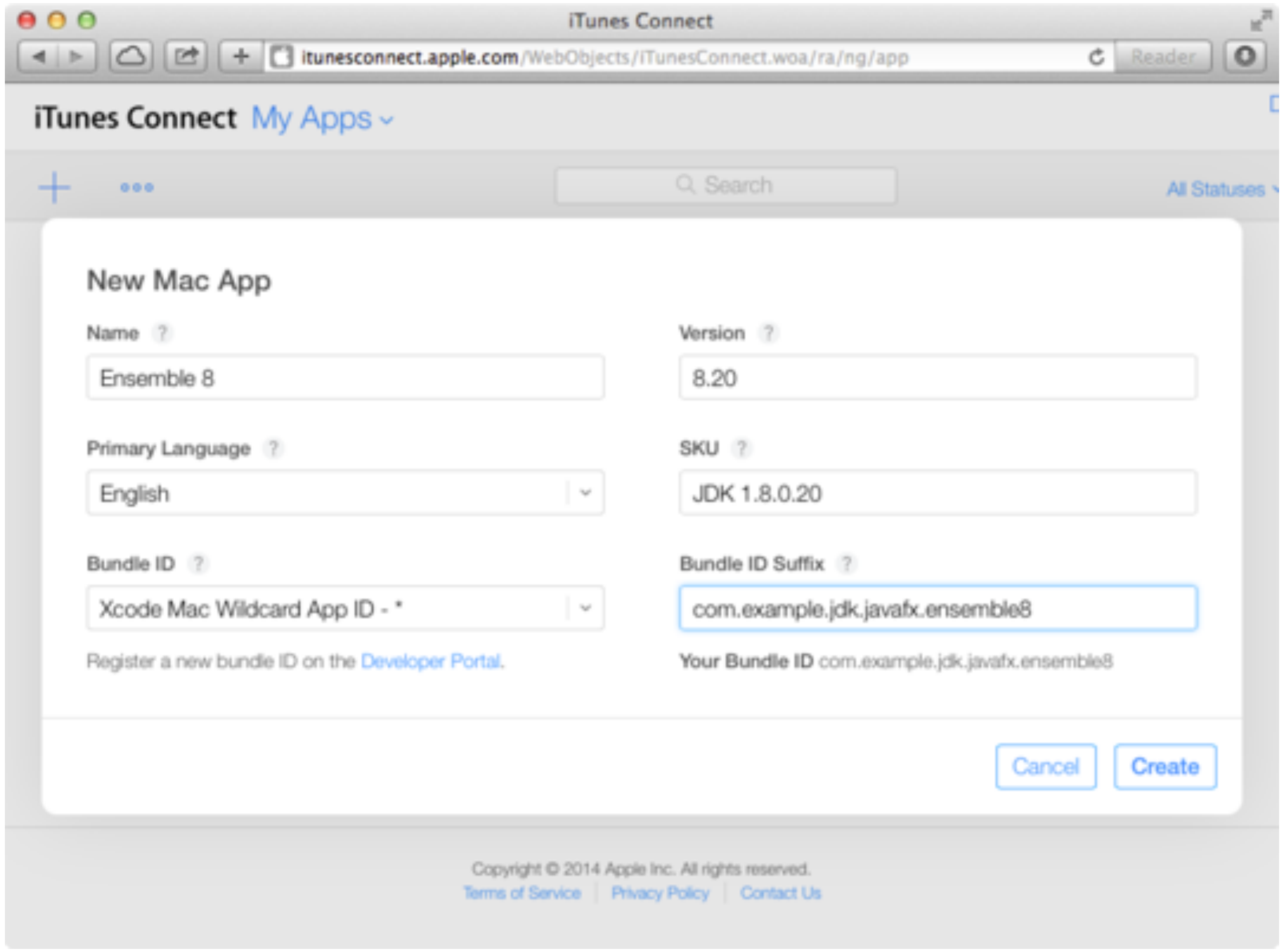
Packaging Your JavaFX Apps for the Mac and the Mac App Store

Steps to submit

- Create an iTunesConnect profile for your application
  - Enter all relevant metadata
  - Upload screenshots
- Run Application Loader
  - Requires Xcode
- Release in iTunesConnect
- Cross Fingers and Wait

Start on iTunes Connect


iTunes Connect
itunesconnect.apple.com
Reader
iTunes Connect
Learn More ›
Sign In to iTunes Connect
duke@example.com
•••
Forgot your Apple ID or password? | Privacy Policy | Copyright © 2014 Apple Inc. All rights reserved.


iTunes Connect
itunesconnect.apple.com/WebObjects/iTunesConnect.woa/ra/ng/app
Reader
iTunes Connect My Apps
Search
All Statuses

New Mac App

Name	Ensemble 8
Version	8.20
Primary Language	English
SKU	JDK 1.8.0.20
Bundle ID	Xcode Mac Wildcard App ID - *
Bundle ID Suffix	com.example.jdk.javafx.ensemble8

Register a new bundle ID on the Developer Portal.

Your Bundle ID com.example.jdk.javafx.ensemble8

Cancel
Create
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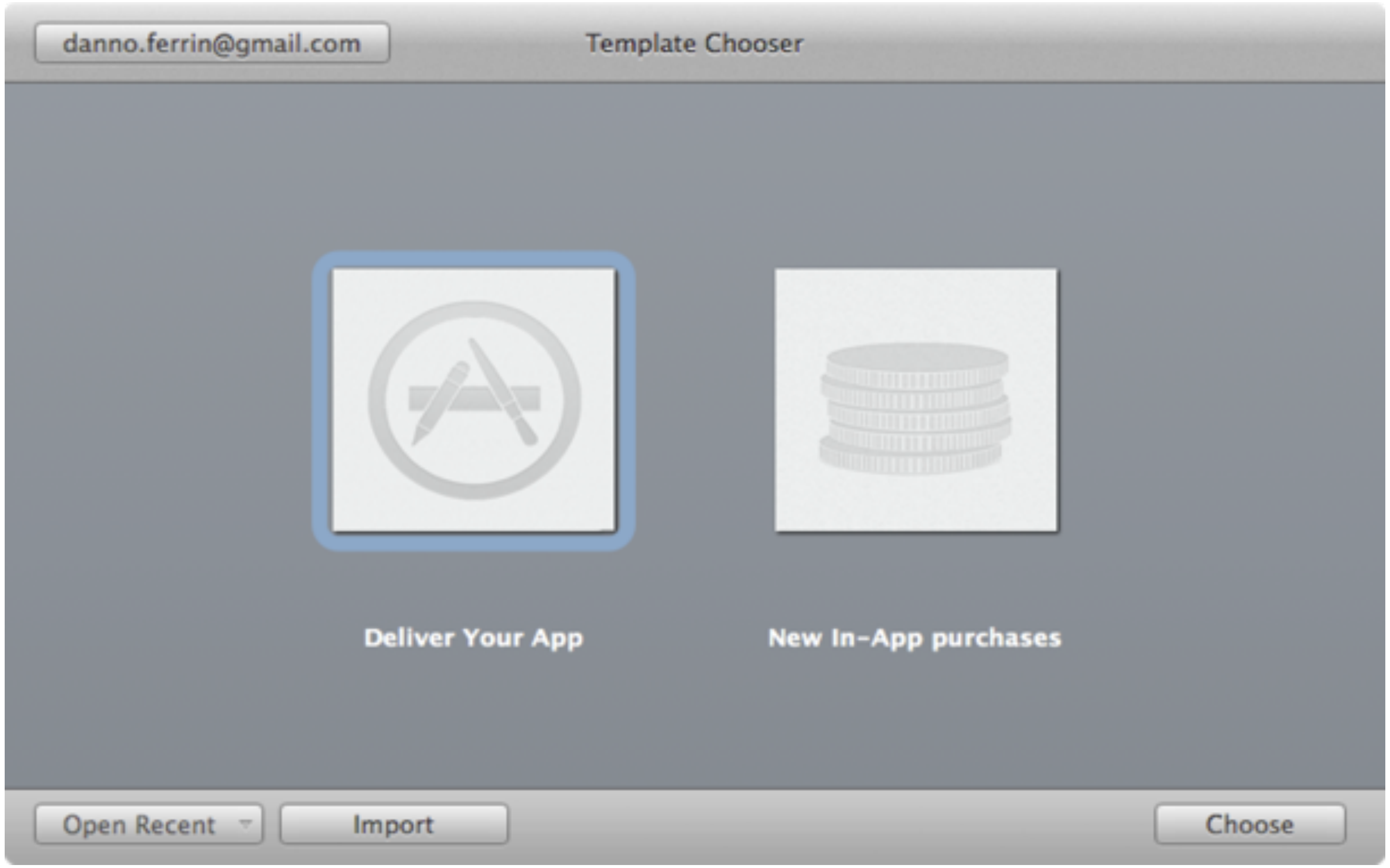
Sreenshots

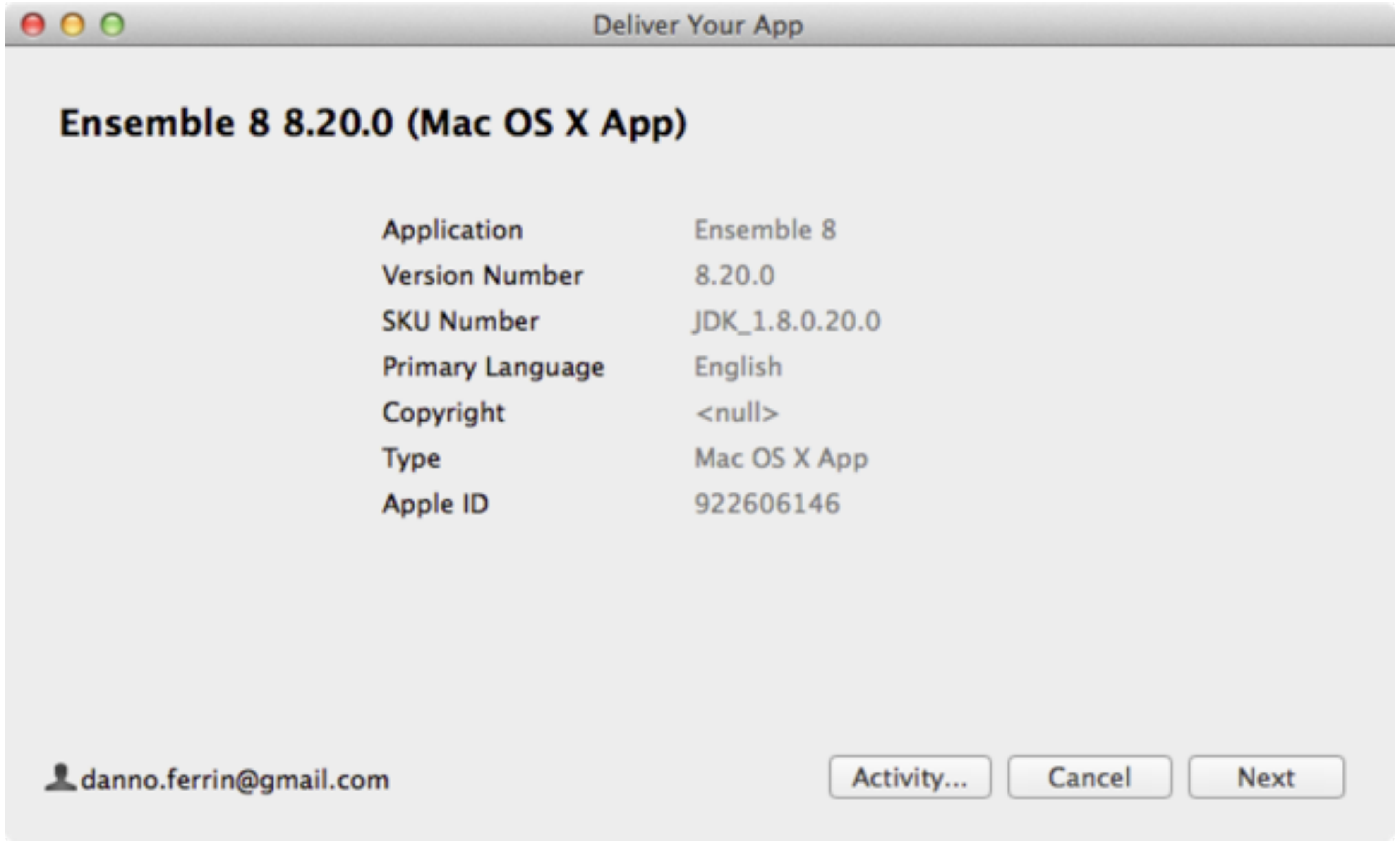
From 1 to 5 screenshots:

- 72 dpi, RGB, flattened, **no transparency**
- High-quality JPEG or PNG image file format in the RGB color space
- 16:10 aspect ratio
- One of the following sizes:
  - 1280 x 800 pixels
  - 1440 x 900 pixels
  - 2880 x 1800 pixels

Application Loader Launch



Application Loader Confirmation

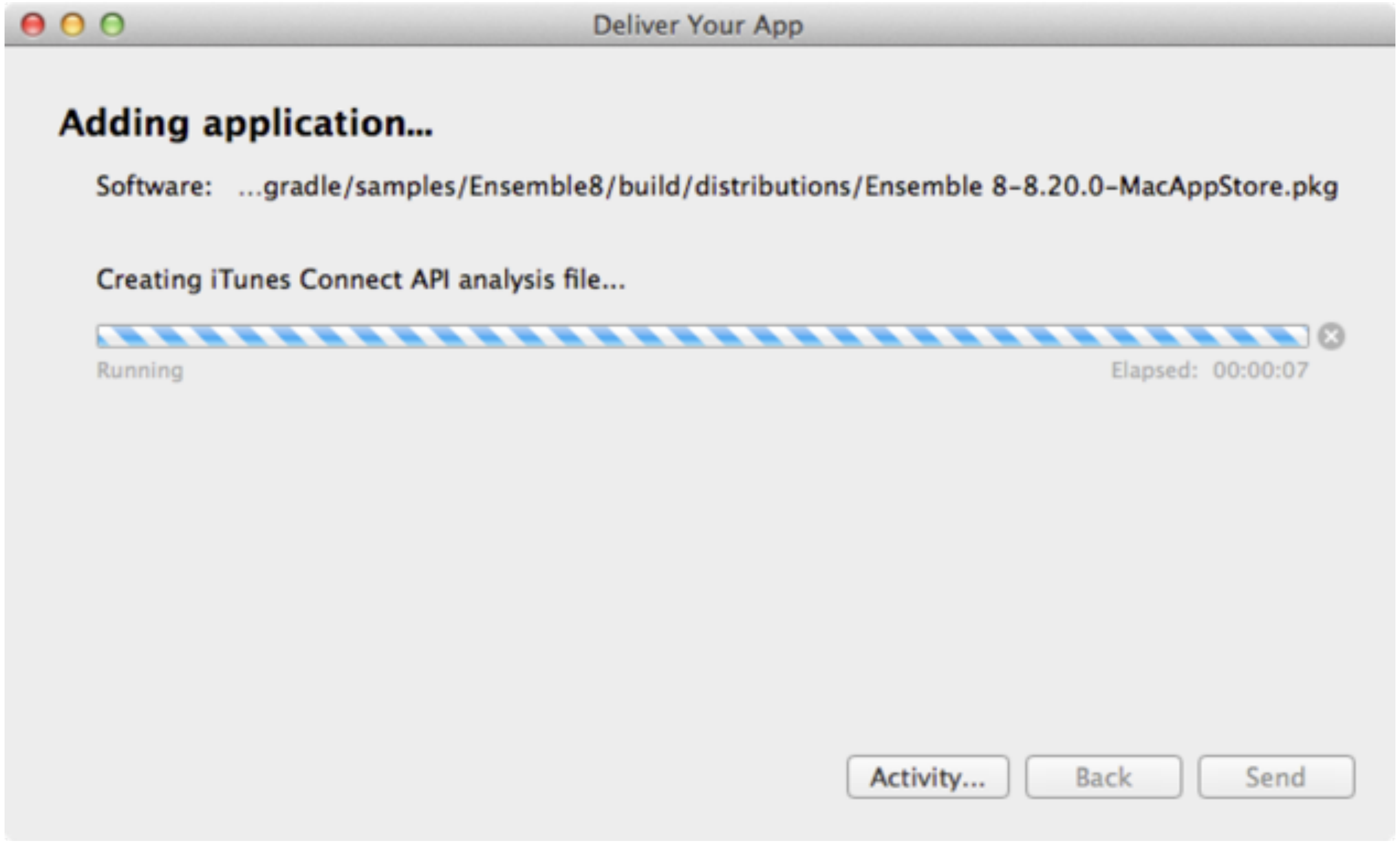


Ensemble 8 8.20.0 (Mac OS X App)

Application	Ensemble 8
Version Number	8.20.0
SKU Number	JDK_1.8.0.20.0
Primary Language	English
Copyright	<null>
Type	Mac OS X App
Apple ID	922606146

danno.ferrin@gmail.com

Application Loader uploading



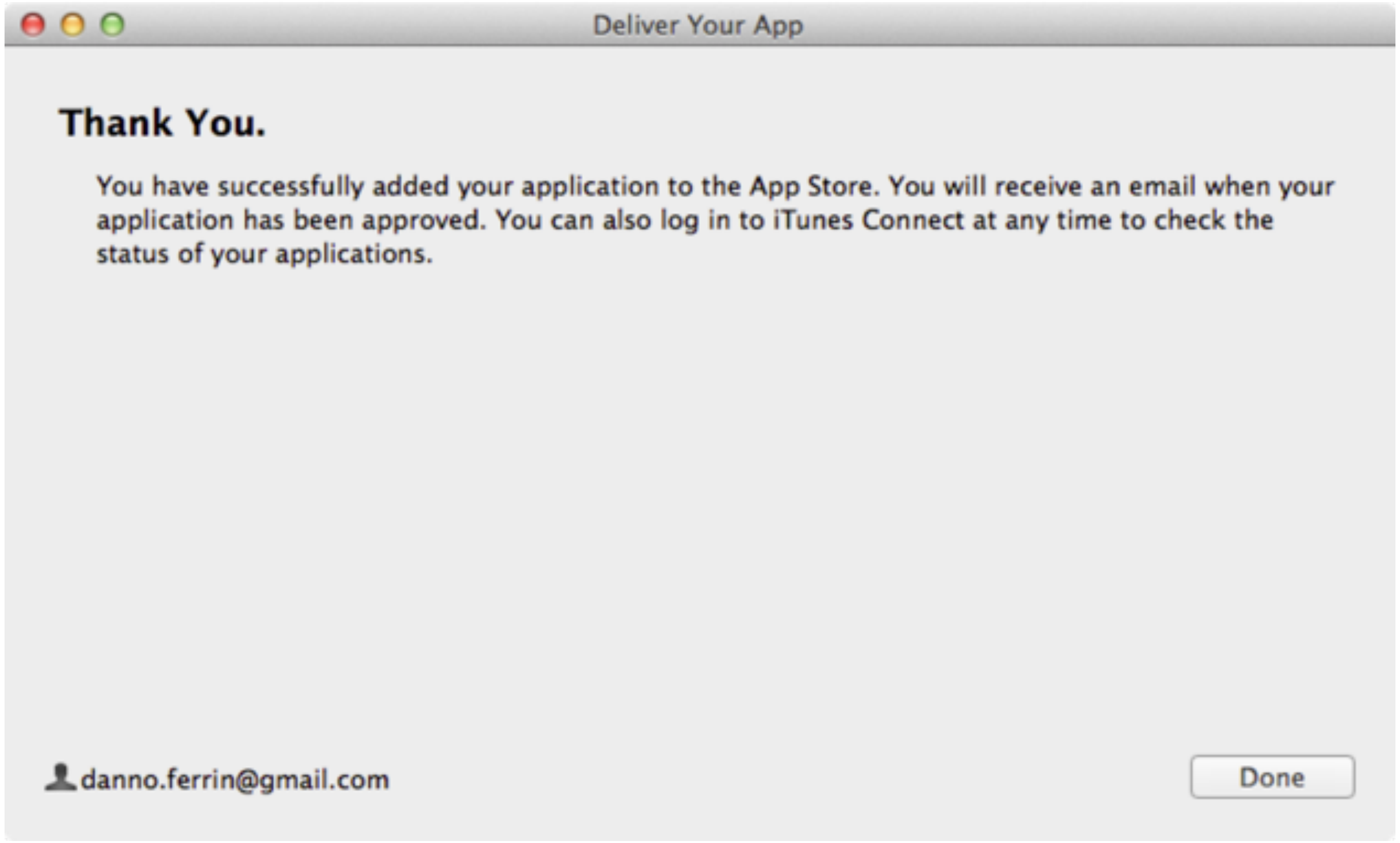
Adding application...

Software: ...gradle/samples/Ensemble8/build/distributions/Ensemble 8-8.20.0-MacAppStore.pkg

Creating iTunes Connect API analysis file...

Running Elapsed: 00:00:07

Application Loader Success

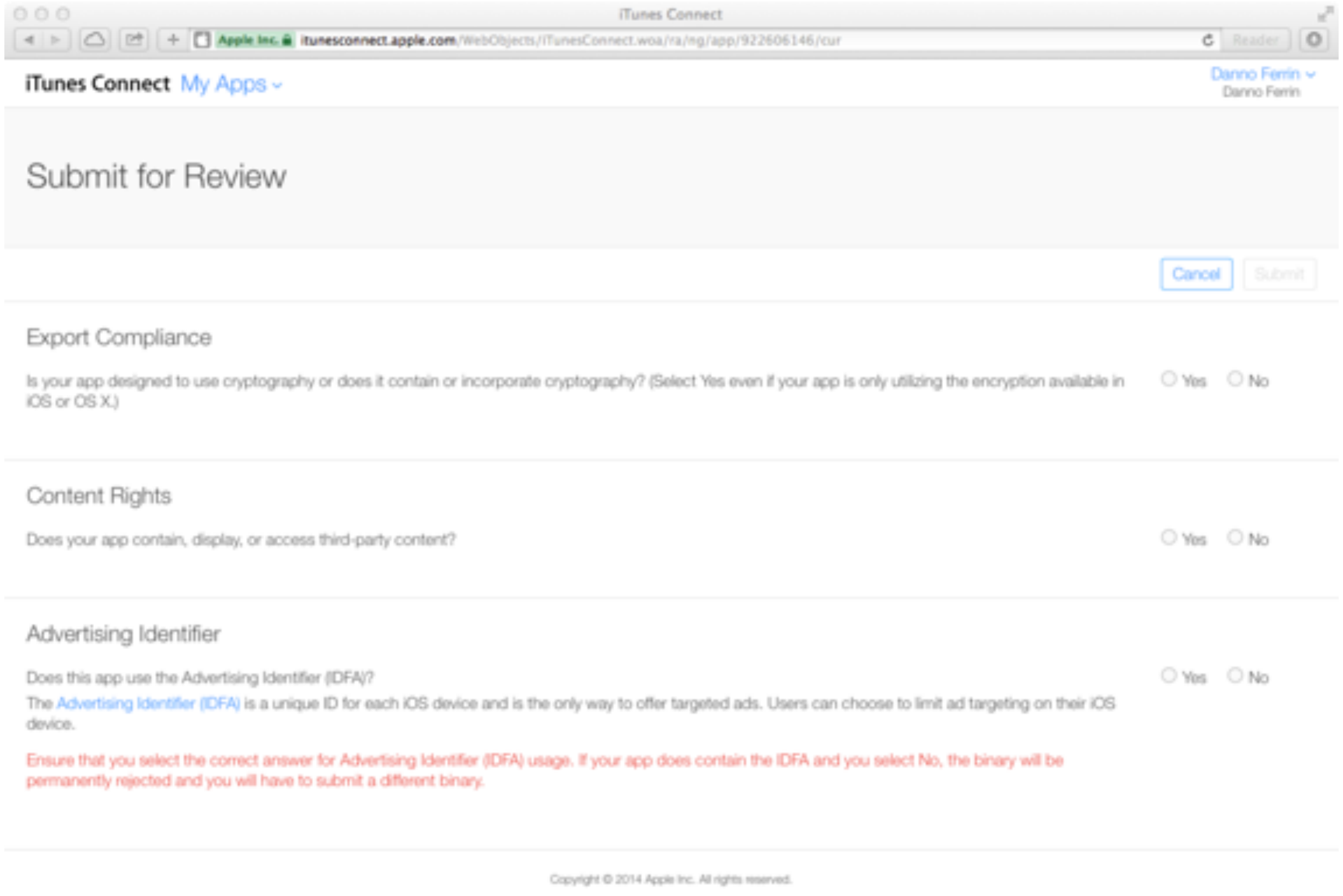


Thank You.

You have successfully added your application to the App Store. You will receive an email when your application has been approved. You can also log in to iTunes Connect at any time to check the status of your applications.

danno.ferrin@gmail.com

A few final questions



iTunes Connect
itunesconnect.apple.com/WebObjects/iTunesConnect.woa/ra/ng/app/922606146/cur
iTunes Connect My Apps
Danno Ferrin
Danno Ferrin

Submit for Review

Export Compliance

Is your app designed to use cryptography or does it contain or incorporate cryptography? (Select Yes even if your app is only utilizing the encryption available in iOS or OS X.) Yes No

Content Rights

Does your app contain, display, or access third-party content? Yes No

Advertising Identifier

Does this app use the Advertising Identifier (IDFA)? Yes No

The Advertising Identifier (IDFA) is a unique ID for each iOS device and is the only way to offer targeted ads. Users can choose to limit ad targeting on their iOS device.

Ensure that you select the correct answer for Advertising Identifier (IDFA) usage. If your app does contain the IDFA and you select No, the binary will be permanently rejected and you will have to submit a different binary.

Submit and wait….

- Mail responses take between 3-7 days.
  - Rejections tend to be quicker
- After acceptance, it can still take up to a day to hit the App Store

- Tip: Don’t make marketing plans until your app is accepted
  - Use “Developer Released” if you need to time the release

Packaging Your JavaFX Apps for the Mac and the Mac App Store

Bugs fixed in 8u40

- JavaFX Media support
- JavaFX Open file Dialog in the sandbox

New Features in 8u40

- Java Packager Hooks for File Associations
- Default Command Line Arguments
- Bundle JRE instead of JDK
- API for easy User JVM Options

Mailing Lists:

- openjfx-dev@openjdk.java.net
- http://mail.openjdk.java.net/mailman/listinfo/openjfx-dev
- macosx-port-dev@openjdk.java.net
- http://mail.openjdk.java.net/mailman/listinfo/macosx-port-dev

Bug Reporting:

- https://javafx-jira.kenai.com
- https://bugs.openjdk.java.net/

Blog

- https://blogs.oracle.com/talkingjavadeployment/

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