



Internationalization and Localization Techniques in Xcode

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British English
Suomi
Norsk
Svenska
Čeština
français
Dansk
日本語
Русский
Polski
한국어
español de España
Nederlands
简体中文
українська
Deutsch
magyar
Italiano
français canadien
română
català
Hrvatski
繁體中文
português de Portugal
Ελληνικά
español de Latinoamérica
American English
Slovenčina
ภาษาไทย
português do Brasil
עברית
Türkçe
العربية
Bahasa Indonesia
Tiếng Việt
Australian English
Bahasa Melayu
हिन्दी

føroyskt íslenska français de
Norsk Belgique Suomi
Cymraeg Saami Svenska Dansk
Русский Gaeilge Vlaams eesti latviešu
български Canadian British Nederlands Polski Japanese
українська English English Deutsch Schweizerdeutsch lietuvių English
беларуская GYU français Österreichisches ქართული 简体中文 アイヌ
македонски Hawai'i français de Suisse català Italiano Azərbaycan srpski イタク
қазақ тілі español de American English español de magyar Čeština 廣東話 繁體中文
español de Latinoamérica España Ελληνικά العربية ئۇيغۇرچە 繁體中文 上海話 粵語
português do Brasil português de Portugal Hrvatski Türkçe اللهجة النجدية Bahasa
Australian English lea slovenščina Slovenčina ภาษาไทย ខ្មែរ ភាសាខ្មែរ Indonesia
Maori fakatonga עברית Indian English اردو ਪੰਜਾਬੀ Tiếng Việt ភាសាខ្មែរ Bahasa
Kiswahili română كَاشُر हिन्दी नेपाली ଓଡ଼ିଆ Filipino Melayu
كوردیى اوزبیک مازنی پښتو ગુજરાતી বাংলা Singaporean English بهاس ملايو
Malti मराठी ಕನ್ನಡ অসমীয়া తెలుగు
پنجابی മലയാളം ಕಿಂಚಿಲ ತಮಿಳು

Agenda

World ready apps

Preparing for localization

Xcode Localization Catalog

World Ready Apps



Cupertino

Mostly Sunny

82°

Sunday Today 90 56

10AM	11AM	12PM	1PM	2PM
75°	80°	84°	87°	89°

Monday		91 58
Tuesday		86 54
Wednesday		81 54
Thursday		70 52
Friday		69 50
Saturday		74 50

كوبرتينو

مشمس أغلب الوقت

٨٢°

الأحد اليوم ٣٢ ١٣

٣ م	٢ م	١ م	١٢ م	١١ ص	١٠ ص
٥٣٢	٥٣٢	٥٣١	٥٢٩	٥٢٧	٥٢٤

١٤ ٣٣		الاثنين
١٢ ٣٠		الثلاثاء
١٢ ٢٧		الأربعاء
١١ ٢١		الخميس
١٠ ٢١		الجمعة
١٠ ٢٣		السبت

Locale

Format information according to the user's customs and preferences

By default, indicates user's current locale: en_US

Frequently used in conjunction with a formatter

Locale

Language Resource Loading

Keyboards and Autocorrect

Collation and Sorting

Use of Symbols, Colors, and Iconography

Number, Date, Time, Currency, Measurement Formats

Formatters

DateFormatter

DateComponentsFormatter

DateIntervalFormatter

PersonNameComponentsFormatter

NumberFormatter

ByteCountFormatter

EnergyFormatter

LengthFormatter

MassFormatter

MeasurementFormatter

Measurements and Units

WWDC 2016

Internationalization Best Practices

WWDC 2016

Formatters

Measurement

```
let distanceInMiles = Measurement(value: 5373, unit: UnitLength.miles)
let formatter = MeasurementFormatter()

formatter.string(from: distanceInMiles) // "5,373 mi"

formatter.locale = Locale(identifier: "ar_SA")
formatter.string(from: distanceInMiles) // "٨,٦٤٦,٩٨٤ كم"

formatter.locale = Locale(identifier: "sv_SE")
formatter.string(from: distanceInMiles) // "8 646,984 km"
```

Strings

`NSString` to load strings in code

`NSStringWithFormat` to get a localized a format string

Comments for context

Strings

Format specifiers supported by NSString/CFString formatting functions

Follows IEEE printf specification

"n\$" positional specifiers

%1\$@ %2\$@ can be reordered

Strings

`stringWithFormat` and `localizedStringWithFormat`

Transform numbering system based on locale

```
// Set a label's text
```

```
label.text = "Population"
```



```
// Set a label's text to a localized string
```

```
label.text = NSLocalizedString("Population", comment: "Label preceding the population value")
```

```
// Load localized string from a specific table
```

```
label.text = NSLocalizedString("Population", tableName: "Localizable", bundle: .main, value: nil, comment: "Label preceding the population value")
```

```
// Create a formatted string
```

```
let format = NSLocalizedString("%d popular languages", comment: "Number of popular languages")  
label.text = String.localizedStringWithFormat(format, popularLanguages.count)
```

Strings

Bidi

localizedStringWithFormat wraps variables with isolates

```
// Create a formatted string
```

```
let scoreMessage = NSLocalizedString("%@ has the high score", comment: "Current winner title")  
label.text = String.localizedStringWithFormat(scoreMessage, currentWinner)
```

Strings

Bidi

Aya has the highest score!



Strings

Bidi

!has the highest score

اية 

Strings

Bidi

اية has the highest score!



Strings

Plurals

```
if popularLanguages.count == 1 {  
    label.text = String.localizedStringWithFormat(NSLocalizedString("1 popular language", comment: "The list contains only one language"))  
} else {  
    label.text = String.localizedStringWithFormat(NSLocalizedString("%d popular languages", comment: "The list contains more than one language"), popularLanguages.count)  
}
```


Strings

Plurals

✓ English

1 popular language

2 popular languages

...

5 popular languages

✗ Russian

Распространенных языков: 1

Распространенных языков: 2

...

Распространенных языков: 5

Strings

Plurals

Key	Type	Value
▼ Strings Dictionary	Dictionary	(1 item)
▼ %d popular language(s)	Dictionary	(2 items)
NSStringLocalizedFormatKey	String	%#@languages@
▼ languages	Dictionary	(4 items)
NSStringFormatSpecTypeKey	String	NSStringPluralRuleType
NSStringFormatValueTypeKey	String	d
one	String	%d popular language
other	String	%d popular languages

```
label.text = String.localizedStringWithFormat(NSLocalizedString("%d popular language(s)", comment: "The list contains more than one language"), popularLanguages.count)
```

Strings

Plurals

Key	Type	Value
▼ Strings Dictionary	Dictionary	(1 item)
▼ %d popular language(s)	Dictionary	(2 items)
NSStringLocalizedFormatKey	String	%#@languages@
▼ languages	Dictionary	(4 items)
NSStringFormatSpecTypeKey	String	NSStringPluralRuleType
NSStringFormatValueTypeKey	String	d
one	String	%d popular language
other	String	%d popular languages

```
label.text = String.localizedStringWithFormat(NSLocalizedString("%d popular language(s)", comment: "The list contains more than one language"), popularLanguages.count)
```

Strings

Plurals

Key	Type	Value
▼ Strings Dictionary	Dictionary	(1 item)
▼ %d popular language(s)	Dictionary	(2 items)
NSStringLocalizedFormatKey	String	%#@languages@
▼ languages	Dictionary	(4 items)
NSStringFormatSpecTypeKey	String	NSStringPluralRuleType
NSStringFormatValueTypeKey	String	d
one	String	%d popular language
other	String	%d popular languages

```
label.text = String.localizedStringWithFormat(NSLocalizedString("%d popular languages", comment: "The list contains more than one language"), popularLanguages.count)
```

Strings

Plurals

Key	Type	Value
▼ Strings Dictionary	Dictionary	(1 item)
▼ %d popular language(s)	Dictionary	(2 items)
NSStringLocalizedFormatKey	String	%#@languages@
▼ languages	Dictionary	(6 items)
NSStringFormatSpecTypeKey	String	NSStringPluralRuleType
NSStringFormatValueTypeKey	String	d
one	String	%d распространенный язык
few	String	%d распространенных языка
many	String	%d распространенных языков
other	String	%d распространенных языка

```
label.text = String.localizedStringWithFormat(NSLocalizedString("%d popular language(s)", comment: "The list contains more than one language"), popularLanguages.count)
```

Strings

Plurals

 Russian

Распространенных языков: 1

Распространенных языков: 2

...

Распространенных языков: 5

 Russian

1 распространенный язык

2 распространенных языка

...

5 распространенных языков

Stringsdict

Gender

Adaptive Width

Platform

Summary

Apple API handle the complexity of data formatting

Isolates for bidirectional text rendering

Strings dictionaries handle pluralization, width variants, and gender

Preparing for Localization

Static Analysis

The screenshot shows the Xcode Static Analyzer interface. The 'PROJECT' is 'VacationPlanet'. The 'TARGETS' list includes 'VacationPlanet' and 'VacationPlanetUIT...'. The 'Static Analyzer - Issues - Apple APIs' section is expanded, showing a table of settings for the 'VacationPlanet' target.

Setting	Value
Improper Handling of NSError and NSError	Yes
Missing Localizability	Yes
Missing Localization Context Comment	Yes
Misuse of Collections API	Yes
Misuse of Grand Central Dispatch	Yes
Performance Anti-Patterns with Grand Central Dispatch	No
Suspicious Conversions of NSNumber and CFNumberRef	Yes (Aggressive)

Static Analysis

```
– (UITableViewCell *)tableView: (UITableView *)tableView cellForRowAtIndexPath:  
  (NSIndexPath *)indexPath {  
  UITableViewCell *cell = [tableView dequeueReusableCellWithIdentifier:@"Cell"  
    forIndexPath:indexPath];
```

```
    cell.textLabel.text = @"Details";
```



User-facing text should use localized string macro

```
    return cell;
```

```
}
```

Pseudolocalization

Default

Lorem Ipsum

Double Length

Lorem Ipsum Lorem Ipsum

Accented Latin

Łořëm Įpşuŋ

Affixed Strings

[#Lorem Ipsum#]

Right to Left

muspl meroL

VacationPlanet > iPhone X

▶ **Build**
2 targets

▶ ▶ **Run**
Debug

▶ **Test**
Debug

▶ **Profile**
Release

▶ **Analyze**
Debug

▶ **Archive**
Release

Info

Arguments

Options

Diagnostics

Application Data

Routing App Coverage File

Localization Debugging Show non-localized strings

Application Language

Application Region

XPC Services Debug XPC services used by this application

Queue Debugging Enable backtrace recording

Duplicate Scheme

Manage Schemes...

Shared

Close

FLIGHTS

 All Destinations >

EXPEDITIONS

 Mars >

 Moon >

 Jupiter >

 Saturn >

 Venus >

CRUISES

 Caribbean >

 Mediterranean >

 Norwegian >

VACATION PACKAGES

 Popular Destinations >

STHGILF

< snoitanitseD IIA 

SNOITIDEPXE

< sraM 

< nooM 

< retipuJ 

< nrutaS 

< suneV 

SESIURC

< naebbiraC 

< naenarretideM 

< naigewroN 

SEGAKCAP NOITACAV

< snoitanitseD ralupoP 

Summary

Check for static analyzer warnings

Test with pseudolanguages

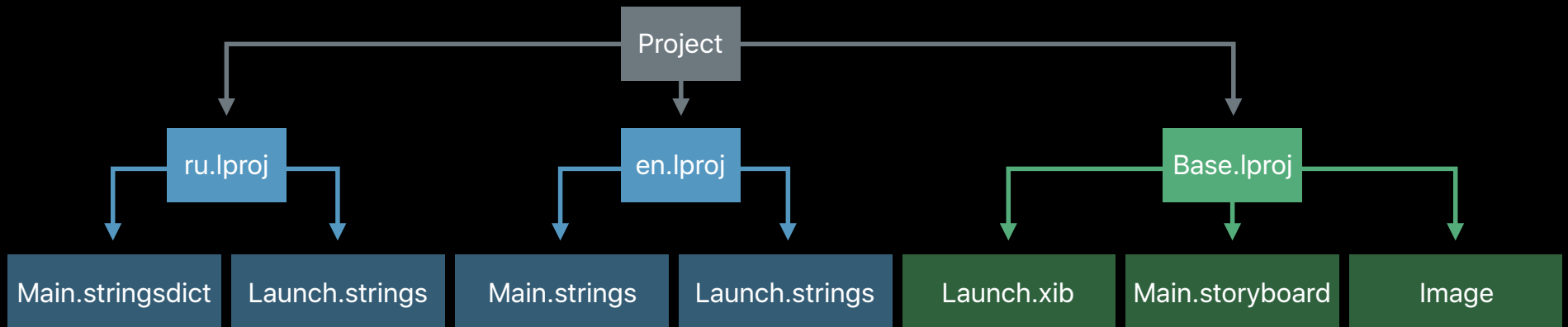
Localization with Xcode

Localization with Xcode

Abstracts localization from development with .lproj

Provides intuitive Export/Import workflow

Localized Resources Structure



Xcode Localization Catalog

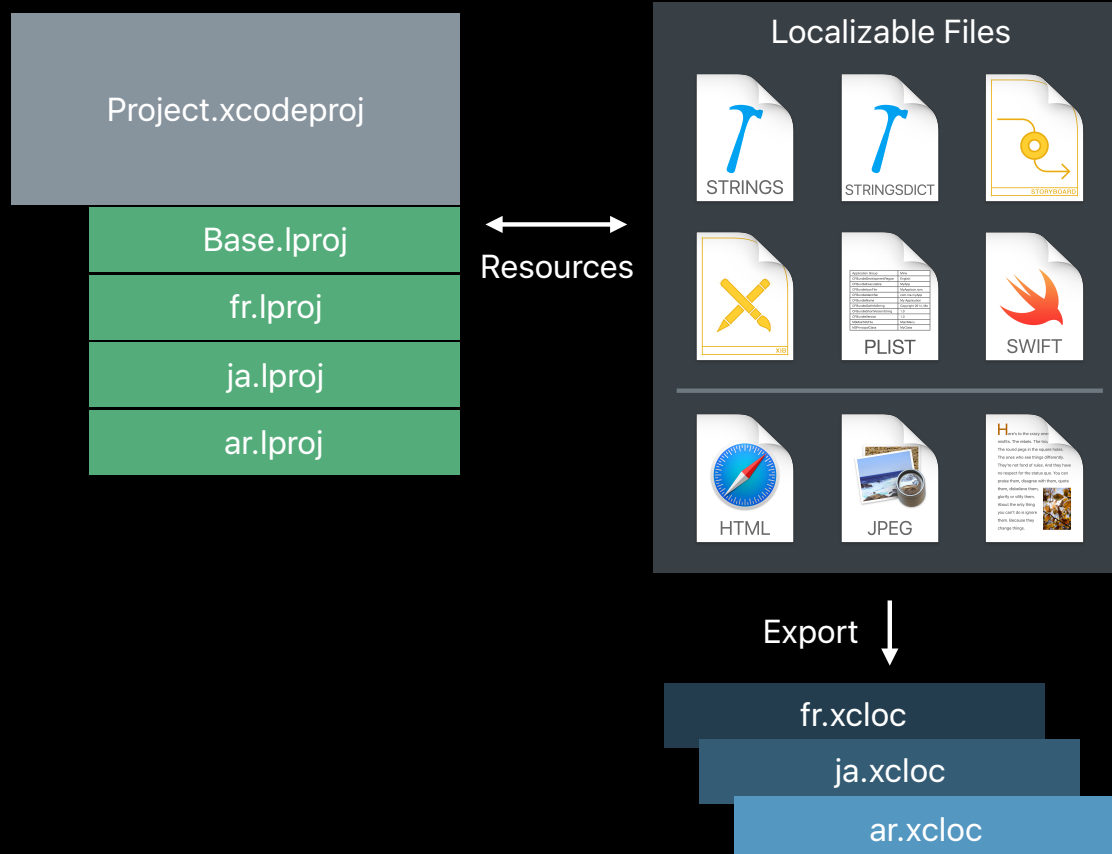
Purpose

`.xcloc` extension

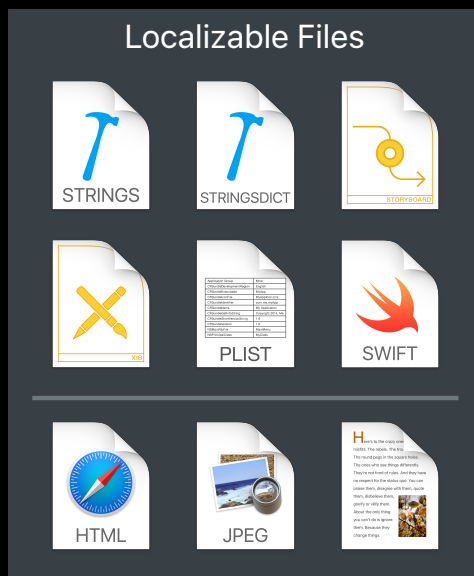
Support localization of assets beyond strings

Provide additional contextual information

Xcode Localization Catalog Structure



Xcode Localization Catalog Structure



Export



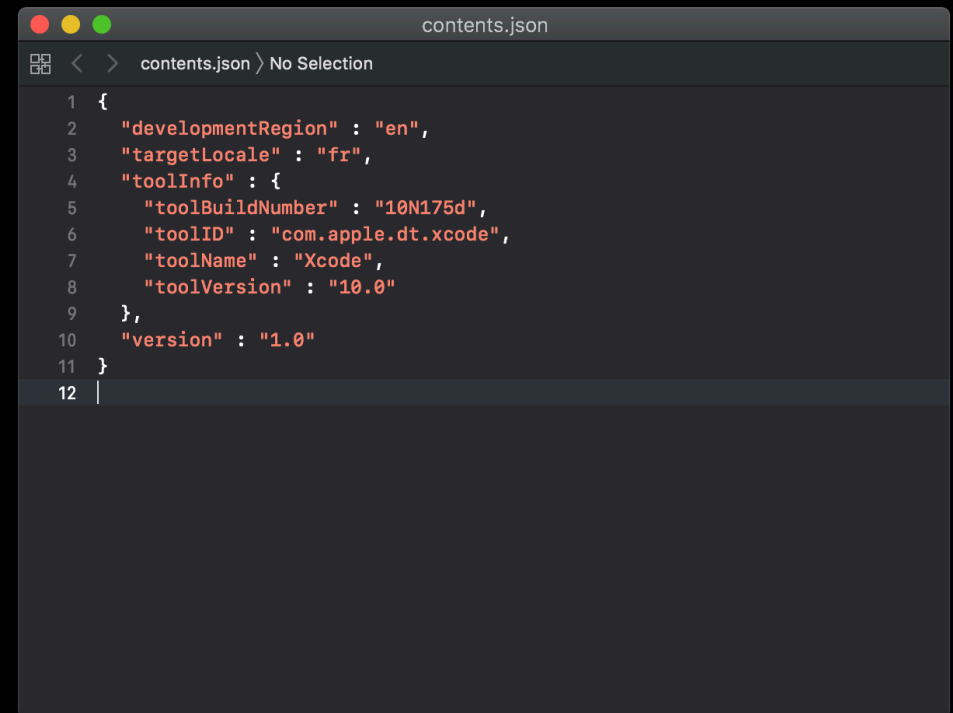
Xcode Localization Catalog

Structure

contents.json

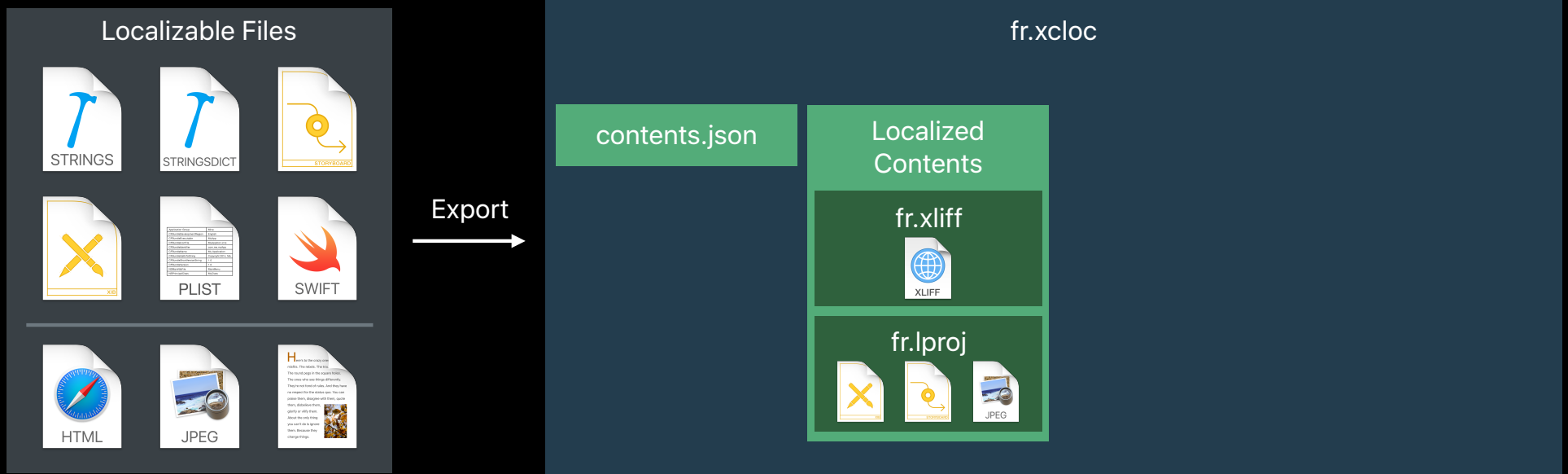
Metadata about the localization catalog

- Development region
- Target locale
- Tool info
- Version



```
1 {
2   "developmentRegion" : "en",
3   "targetLocale" : "fr",
4   "toolInfo" : {
5     "toolBuildNumber" : "10N175d",
6     "toolID" : "com.apple.dt.xcode",
7     "toolName" : "Xcode",
8     "toolVersion" : "10.0"
9   },
10  "version" : "1.0"
11 }
12 |
```

Xcode Localization Catalog Structure



Xcode Localization Catalog

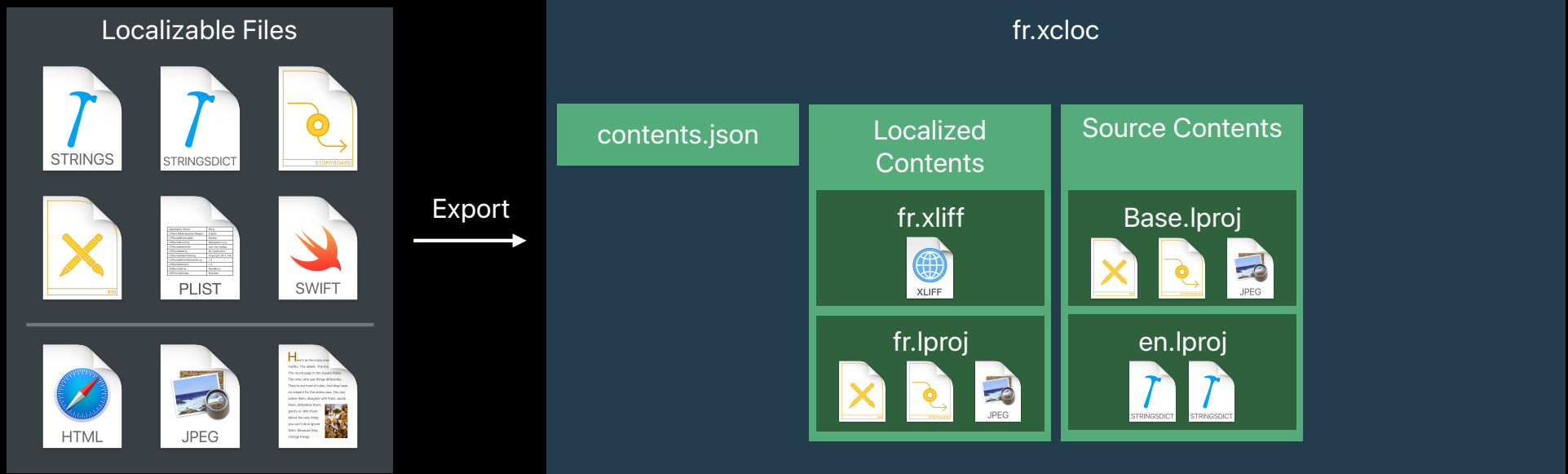
Structure

Localized Contents

- XLIFF 1.2 document containing the project localizable strings
- Non-strings localizable assets
- Organized into the same file system hierarchy as Xcode project
- Override resources



Xcode Localization Catalog Structure



Xcode Localization Catalog

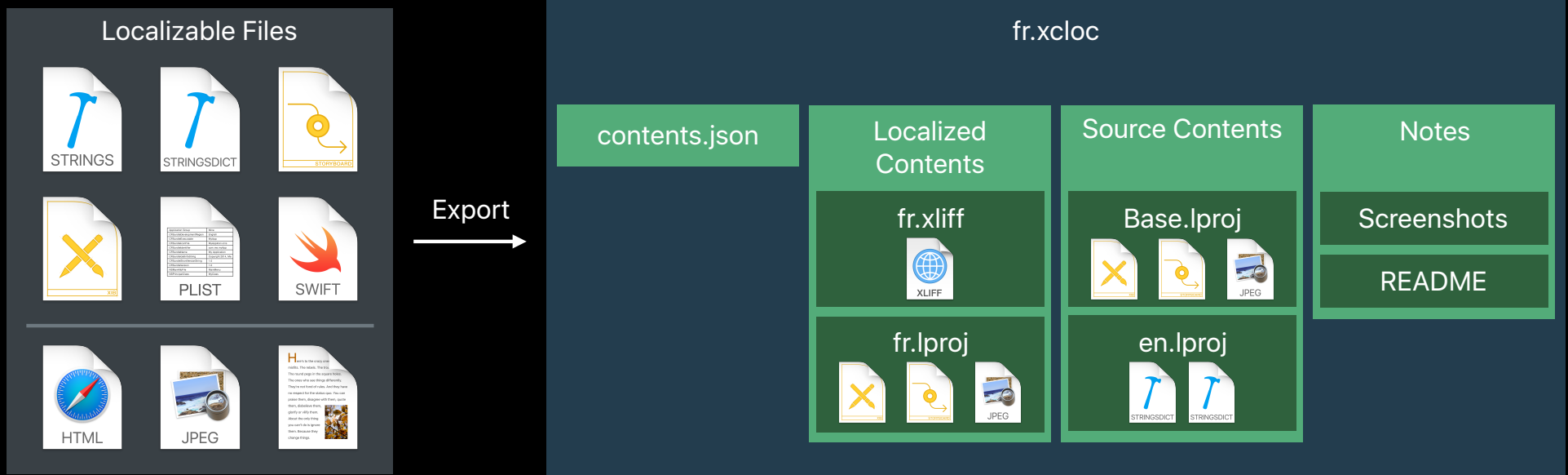
Structure

Source Contents

- Assets used to produce the Localized Contents
- Organized into the same file system hierarchy as Xcode project
- Provided for context



Xcode Localization Catalog Structure



Xcode Localization Catalog

Structure

Notes

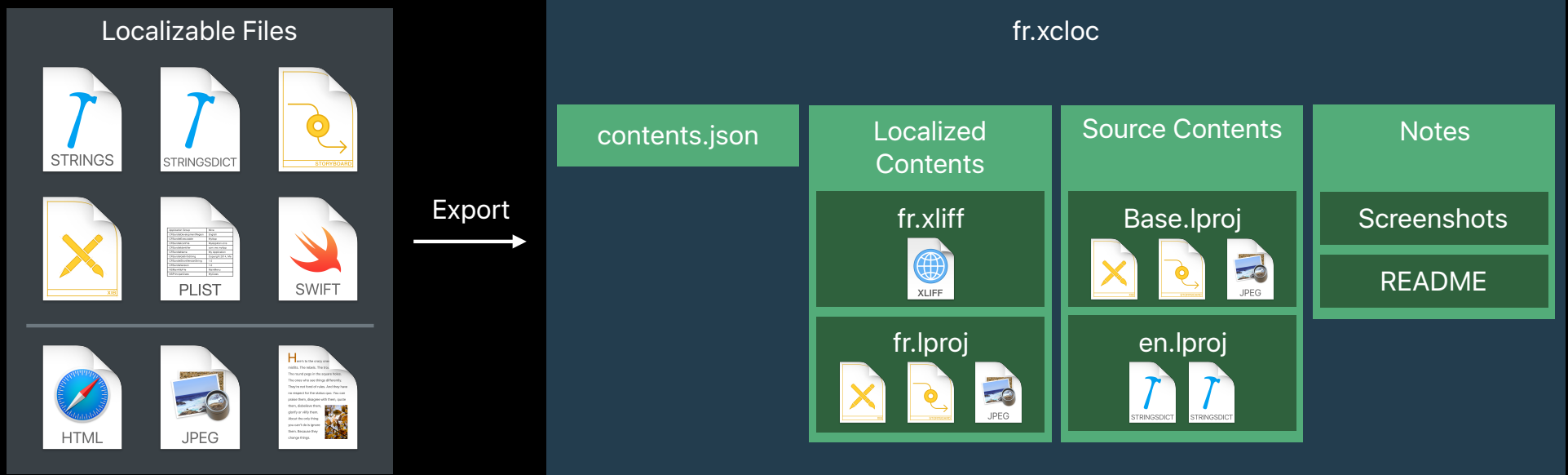
- Provide additional information to the localizers:
 - Screenshots
 - Readme file

Notes

Screenshots

README

Xcode Localization Catalog Structure



Xcode Localization Catalog

Continuous integration—export

Xcode Localization Catalog

```
$ xcodebuild -exportLocalizations -project <projectname> -localizationPath <dirpath>  
[[-exportLanguage <targetlanguage>] ...]
```

Xcode Localization Catalog

Continuous integration—import

Xcode Localization Catalog

```
$ xcodebuild -importLocalizations -project <projectname> -localizationPath </path/to/language.xcloc>
```

XLIFF file

```
$ xcodebuild -importLocalizations -project <projectname> -localizationPath </path/to/language.xliff>
```

Demo

Xcode Localization Catalog

Summary

New standard for localization export and import

Provides more flexibility and context for localizers

Increased file type support for nonstring resources

Continuous integration support

<http://www.unicodeconference.org/eval-sp>

Session 11, track 1



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