

Building from the Command Line with Xcode

Session 404

Anders Bertelrud

Xcode Architect

These are confidential sessions—please refrain from streaming, blogging, or taking pictures

Roadmap

- Why use the command line?

Roadmap

- Why use the command line?
- Using `xcodebuild`

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- Using `xcodebuild`
- Customizing your project

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- Customizing your project
- Automating `xcodebuild`

Roadmap

- Why use the command line?
- Using `xcodebuild`
- Customizing your project
- Automating `xcodebuild`
- Working outside Xcode

Why Use the Command Line?

Why Use the Command Line?

Why Use the Command Line?

- Automation
 - Nightly release builds
 - Continuous Integration systems

Why Use the Command Line?

- Automation
 - Nightly release builds
 - Continuous Integration systems
- Make-based open source development
 - Cross-platform code
 - MacPorts, Fink, Homebrew...

Using `xcodebuild`

What Is xcodebuild?

What Is `xcodebuild`?

- Command line access to Xcode IDE

What Is `xcodebuild`?

- Command line access to Xcode IDE
- Works with projects and workspaces

What Is xcodebuild?

- Command line access to Xcode IDE
- Works with projects and workspaces
- Batch operations
 - Build
 - Archive
 - Query

What Is `xcodebuild`?

- Command line access to Xcode IDE
- Works with projects and workspaces
- Batch operations
 - Build
 - Archive
 - Query
- Use `man xcodebuild` for the details

Using `xcodebuild`

Using xcodebuild

A terminal window with a dark green background and a silver frame. In the top-left corner, there is a white prompt character '>' followed by a yellow vertical bar representing a cursor.

> |

Using xcodebuild

```
> cd ~/Documents/MyProjectDir
```

Using xcodebuild

```
> cd ~/Documents/MyProjectDir
```

```
> █
```

Using xcodebuild

```
> cd ~/Documents/MyProjectDir  
> xcodebuild
```

Using xcodebuild

```
> cd ~/Documents/MyProjectDir
> xcodebuild
=== BUILD NATIVE TARGET Baffle OSX OF PROJECT Baffle
OSX WITH CONFIGURATION Debug ===

ProcessPCH build/Intermediates/PrecompiledHeaders/BaffleCocoa_Prefix-dkhujstkymhfqbdirzilncxtxa/BaffleCocoa_Prefix.pch.pth OtherSources/BaffleCocoa_Prefix.pch normal x86_64 objective-c com.apple.compilers.llvm.clang.1_0.compiler
```

```
:
```

Build Log Structure

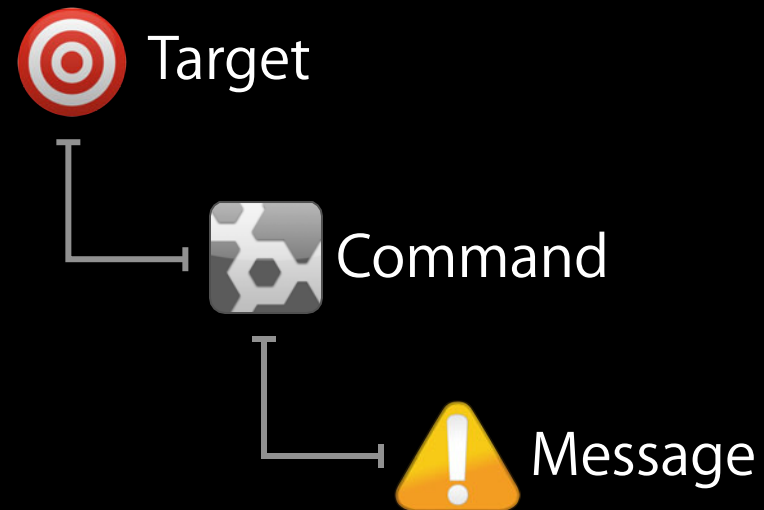
Build Log Structure



Build Log Structure



Build Log Structure



Build Logs in the Console

```
=== BUILD NATIVE TARGET Baffle OSX OF PROJECT Baffle OSX
CpResource ../SharedResources/BGShake.png build/Debug/Ba
  cd /Users/anders/WWDC2012/Baffle
  builtin-copy -exclude .DS_Store -exclude CVS -exclud
CpResource ../SharedResources/BGCubeFace.png build/Debug
  cd /Users/anders/WWDC2012/Baffle
  builtin-copy -exclude .DS_Store -exclude CVS -exclud
CpResource ../SharedResources/BGSwirl-Green.png build/De
  cd /Users/anders/WWDC2012/Baffle
  builtin-copy -exclude .DS_Store -exclude CVS -exclud
CopyStringsFile build/Debug/Baffle\ OSX.app/Contents/Res
  cd /Users/anders/WWDC2012/Baffle
  builtin-copyStrings --validate --inputencoding utf-1
```

Build Logs in the Console

```
=== BUILD NATIVE TARGET Baffle OSX OF PROJECT Baffle OSX
```

```
CpResource ../SharedResources/BGShake.png build/Debug/Baffle
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```

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CpResource ../SharedResources/BGCubeFace.png build/Debug
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cd /Users/anders/WWDC2012/Baffle
builtin-copy -exclude .DS_Store -exclude CVS -exclud
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Build Logs in the Console

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```

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Build Logs in the Console

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builtin-copy -exclude .DS_Store -exclude CVS -exclud
CopyStringsFile build/Debug/Baffle\ OSX.app/Contents/Res
cd /Users/anders/WDC2012/Baffle
builtin-copyStrings --validate --inputencoding utf-1
CompileXIB Resources/English.lproj/MainMenu.xib
cd /Users/anders/WDC2012/Baffle
setenv XCODE_DEVELOPER_USR_PATH /Applications/Xcode.
/Applications/Xcode.app/Contents/Developer/usr/bin/i
CpResource ../SharedResources/Countdown.caf build/Debug
cd /Users/anders/WDC2012/Baffle
builtin-copy -exclude .DS_Store -exclude CVS -exclud
:
ProcessPCH build/Intermediates/PrecompiledHeaders/Baffle
cd /Users/anders/WDC2012/Baffle
setenv LANG en_US.UTF-8
```

Build Logs in the Console

```
builtin-copy -exclude .DS_Store -exclude CVS -exclud
CopyStringsFile build/Debug/Baffle\ OSX.app/Contents/Res
cd /Users/anders/WDC2012/Baffle
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CompileXIB Resources/English.lproj/MainMenu.xib
cd /Users/anders/WDC2012/Baffle
setenv XCODE_DEVELOPER_USR_PATH /Applications/Xcode.
/Applications/Xcode.app/Contents/Developer/usr/bin/i
CpResource ../SharedResources/Countdown.caf build/Debug
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cd /Users/anders/WDC2012/Baffle
setenv LANG en_US.UTF-8
```

Build Logs in the Console

```
ProcessPCH build/Intermediates/PrecompiledHeaders/Baffle
  cd /Users/anders/WDC2012/Baffle
  setenv LANG en_US.US-ASCII
  clang -x objective-c -arch x86_64 -std=c99 -O0 -Wswi

CompileC ../SharedCode/BGBaffleWord.m normal x86_64 obje
  cd /Users/anders/WDC2012/Baffle
  setenv LANG en_US.US-ASCII
  clang -x objective-c -arch x86_64 -std=c99 -O0 -Wswi

CompileC ./OtherSources/main.m normal x86_64 objective-c
  cd /Users/anders/WDC2012/Baffle
  setenv LANG en_US.US-ASCII
  clang -x objective-c -arch x86_64 -std=c99 -O0 -Wswi
```

Build Logs in the Console

```
ProcessPCH build/Intermediates/PrecompiledHeaders/Baffle  
cd /Users/anders/WDC2012/Baffle  
setenv LANG en_US.US-ASCII  
clang -x objective-c -arch x86_64 -std=c99 -O0 -Wswi
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CompileC ../SharedCode/BGBaffleWord.m normal x86_64 obje  
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CompileC ./OtherSources/main.m normal x86_64 objective-c  
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cd /Users/anders/WDC2012/Baffle  
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CompileC ./OtherSources/main.m normal x86_64 objective-c
  cd /Users/anders/WDC2012/Baffle
  setenv LANG en_US.US-ASCII
  clang -x objective-c -arch x86_64 -std=c99 -O0 -Wswi
```

Build Logs in the Console

```
clang -x objective-c -arch x86_64 -std=c99 -O0 -WSW1  
:  
Ld build/Debug/Baffle\ OSX.app/Contents/MacOS/Baffle\ OS  
cd /Users/anders/WWDC2012/Baffle  
setenv MACOSX_DEPLOYMENT_TARGET 10.8  
clang -arch x86_64 -fobjc-link-runtime -mmacosx-vers  
  
** BUILD SUCCEEDED **
```

Build Logs in the Console

```
clang -x objective-c -arch x86_64 -std=c99 -O0 -WSWI
```

```
:
```

```
Ld build/Debug/Baffle\ OSX.app/Contents/MacOS/Baffle\ OS  
cd /Users/anders/WWDC2012/Baffle  
setenv MACOSX_DEPLOYMENT_TARGET 10.8  
clang -arch x86_64 -fobjc-link-runtime -mmacosx-vers
```

```
** BUILD SUCCEEDED **
```


Build Logs in the Console

```
clang -x objective-c -arch x86_64 -std=c99 -O0 -WSWI  
:  
Ld build/Debug/Baffle\ OSX.app/Contents/MacOS/Baffle\ OS  
cd /Users/anders/WWDC2012/Baffle  
setenv MACOSX_DEPLOYMENT_TARGET 10.8  
clang -arch x86_64 -fobjc-link-runtime -mmacosx-vers  
** BUILD SUCCEEDED **
```

Build Logs in the Console

```
clang -x objective-c -arch x86_64 -std=c99 -O0 -WSW1
```

```
:
```

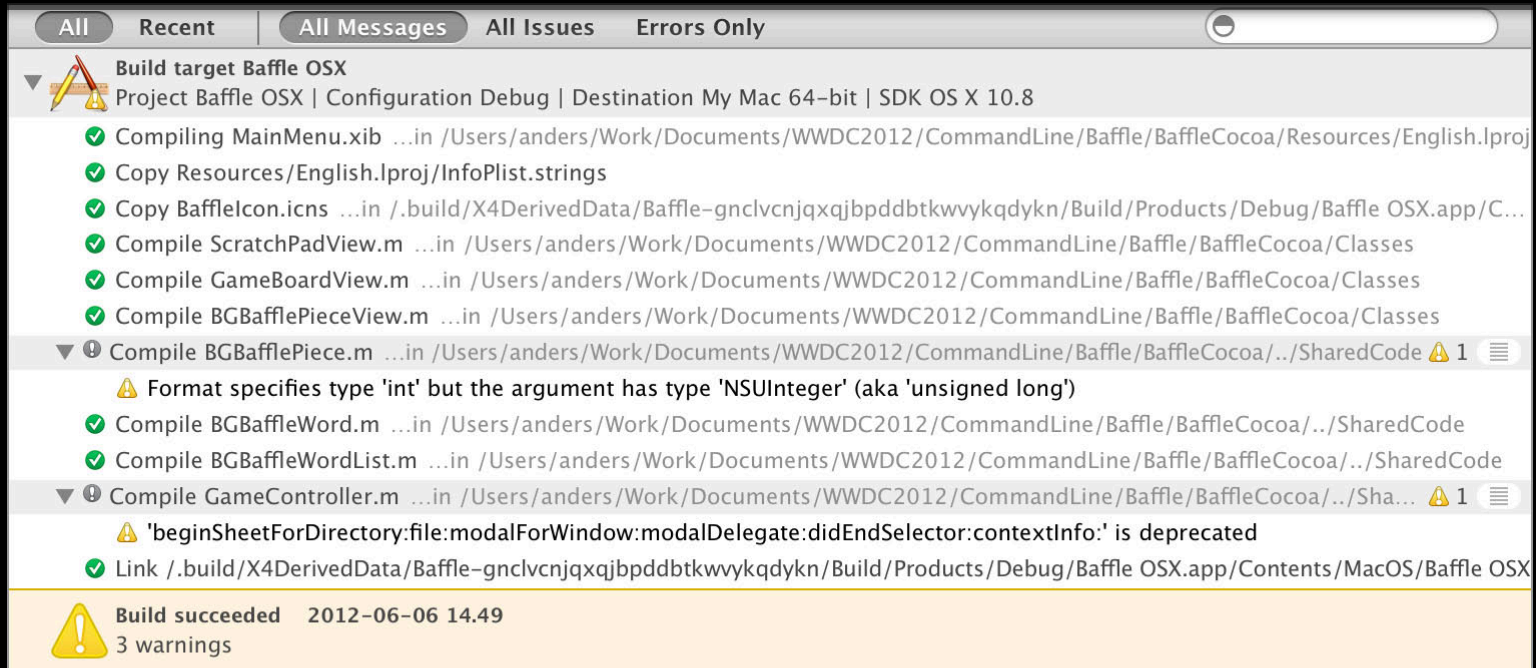
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Ld build/Debug/Baffle\ OSX.app/Contents/MacOS/Baffle\ OS  
cd /Users/anders/WWDC2012/Baffle  
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```

```
** BUILD SUCCEEDED **
```

Build Logs in the Console

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clang -x objective-c -arch x86_64 -std=c99 -O0 -WSWI  
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cd /Users/anders/WWDC2012/Baffle  
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clang -arch x86_64 -fobjc-link-runtime -mmacosx-vers  
  
** BUILD SUCCEEDED **
```

Build Logs in the IDE



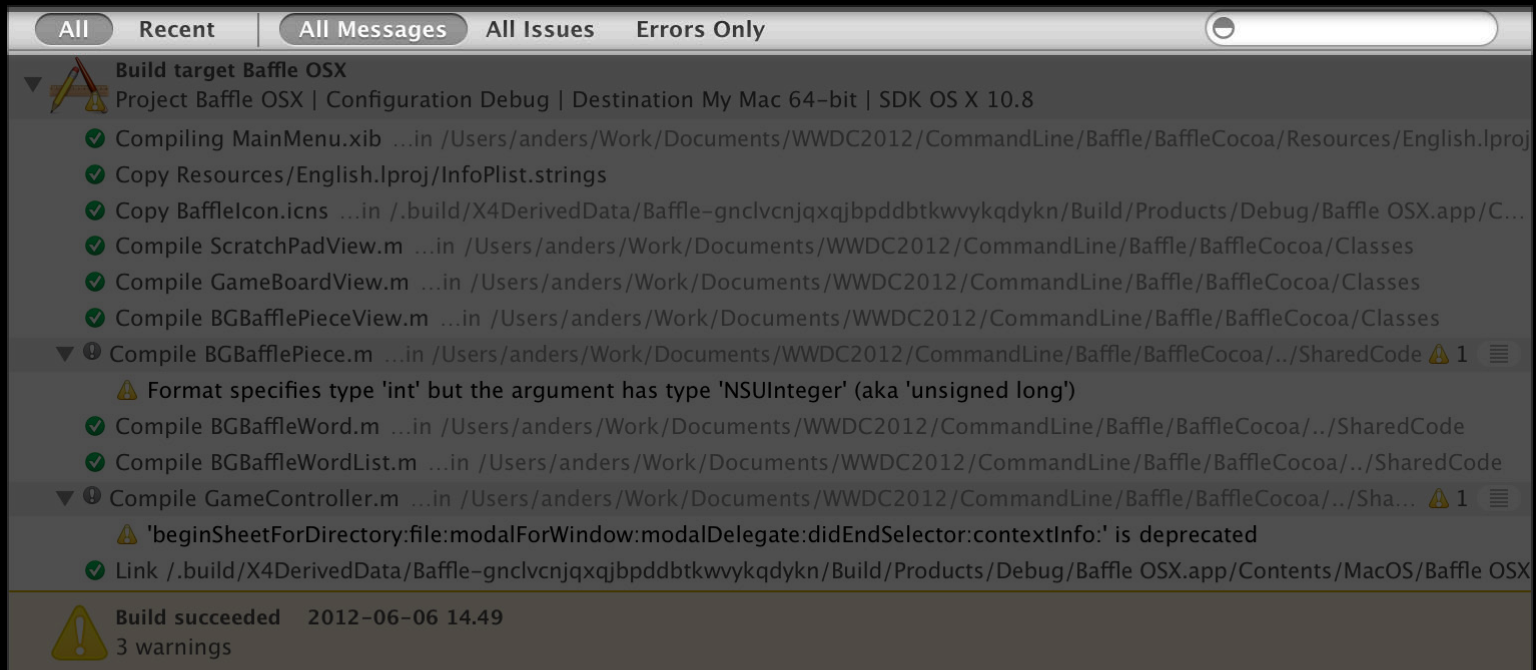
The screenshot shows the Xcode IDE's build log window. At the top, there are tabs for 'All', 'Recent', 'All Messages', 'All Issues', and 'Errors Only'. The main content area displays a list of build tasks for the target 'Baffle OSX'. Most tasks are marked with a green checkmark, indicating they completed successfully. Two tasks are marked with a yellow warning icon: 'Compile BGBafflePiece.m' and 'Compile GameController.m'. The warning for 'Compile BGBafflePiece.m' states: 'Format specifies type 'int' but the argument has type 'NSUInteger' (aka 'unsigned long')'. The warning for 'Compile GameController.m' states: ''beginSheetForDirectory:file:modalForWindow:modalDelegate:didEndSelector:contextInfo:' is deprecated'. At the bottom of the log, a yellow bar indicates 'Build succeeded 2012-06-06 14.49' with '3 warnings'.

Build target Baffle OSX
Project Baffle OSX | Configuration Debug | Destination My Mac 64-bit | SDK OS X 10.8

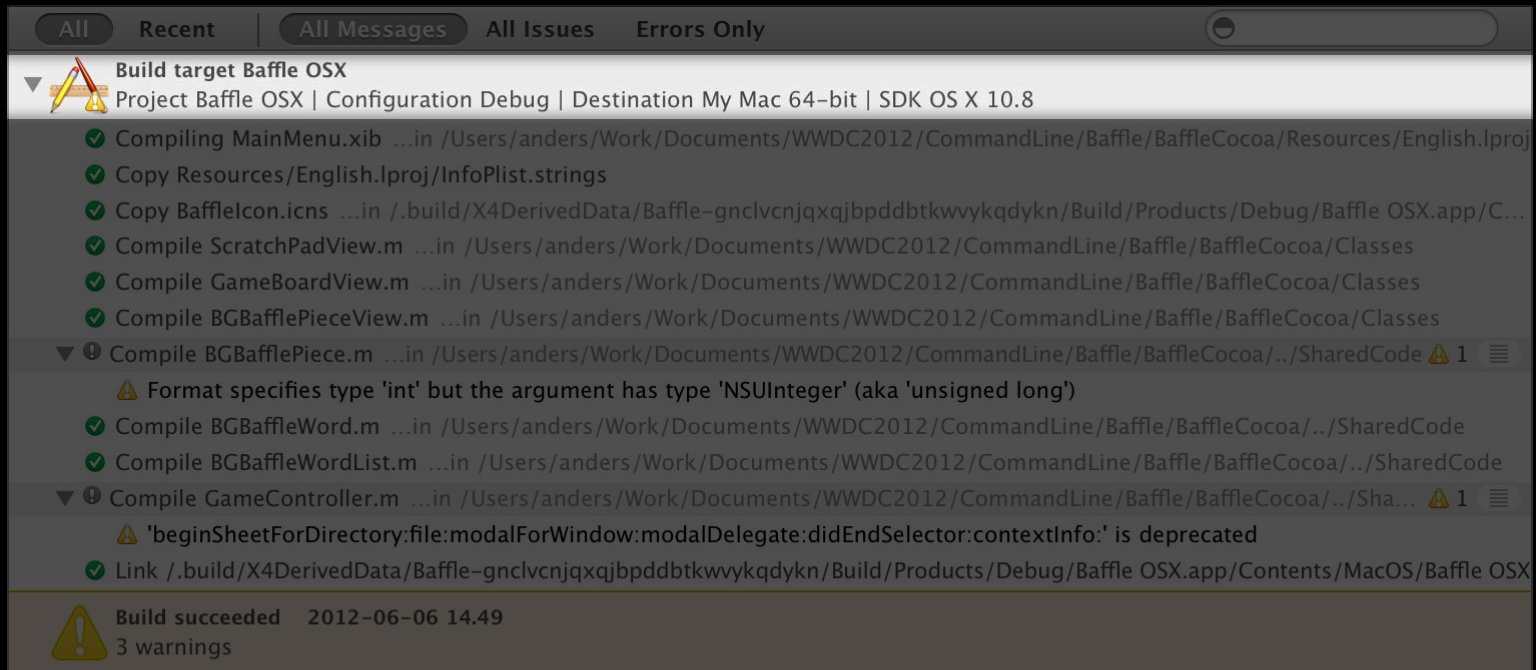
- ✓ Compiling MainMenu.xib ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Resources/English.lproj
- ✓ Copy Resources/English.lproj/InfoPlist.strings
- ✓ Copy BaffleIcon.icns ...in /.build/X4DerivedData/Baffle-gnclvcnjqxqjbpdbtkwvykqdykn/Build/Products/Debug/Baffle OSX.app/C...
- ✓ Compile ScratchPadView.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Classes
- ✓ Compile GameBoardView.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Classes
- ✓ Compile BGBafflePieceView.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Classes
- ⚠ Compile BGBafflePiece.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/./SharedCode ⚠ 1
- ⚠ Format specifies type 'int' but the argument has type 'NSUInteger' (aka 'unsigned long')
- ✓ Compile BGBaffleWord.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/./SharedCode
- ✓ Compile BGBaffleWordList.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/./SharedCode
- ⚠ Compile GameController.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/./Sha... ⚠ 1
- ⚠ 'beginSheetForDirectory:file:modalForWindow:modalDelegate:didEndSelector:contextInfo:' is deprecated
- ✓ Link /.build/X4DerivedData/Baffle-gnclvcnjqxqjbpdbtkwvykqdykn/Build/Products/Debug/Baffle OSX.app/Contents/MacOS/Baffle OSX

Build succeeded 2012-06-06 14.49
3 warnings

Build Logs in the IDE



Build Logs in the IDE



The screenshot shows the Xcode IDE's build log window. At the top, there are tabs for 'All', 'Recent', 'All Messages', 'All Issues', and 'Errors Only'. The main log area is titled 'Build target Baffle OSX' and shows the configuration: 'Project Baffle OSX | Configuration Debug | Destination My Mac 64-bit | SDK OS X 10.8'. The log contains several entries, most of which are successful (green checkmarks):

- ✓ Compiling MainMenu.xib ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Resources/English.lproj
- ✓ Copy Resources/English.lproj/InfoPlist.strings
- ✓ Copy BaffleIcon.icns ...in /.build/X4DerivedData/Baffle-gnclvcnjqxqjbpdbtkwvykqdykn/Build/Products/Debug/Baffle OSX.app/C...
- ✓ Compile ScratchPadView.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Classes
- ✓ Compile GameBoardView.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Classes
- ✓ Compile BGBafflePieceView.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Classes
- ⚠ Compile BGBafflePiece.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/./SharedCode ⚠ 1
- ⚠ Format specifies type 'int' but the argument has type 'NSUInteger' (aka 'unsigned long')
- ✓ Compile BGBaffleWord.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/./SharedCode
- ✓ Compile BGBaffleWordList.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/./SharedCode
- ⚠ Compile GameController.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/./Sha... ⚠ 1
- ⚠ 'beginSheetForDirectory:file:modalForWindow:modalDelegate:didEndSelector:contextInfo:' is deprecated
- ✓ Link /.build/X4DerivedData/Baffle-gnclvcnjqxqjbpdbtkwvykqdykn/Build/Products/Debug/Baffle OSX.app/Contents/MacOS/Baffle OSX

At the bottom of the log, a summary line reads: **Build succeeded** 2012-06-06 14.49, with 3 warnings.

Build Logs in the IDE

The screenshot shows the Xcode IDE's build log window. At the top, there are tabs for 'All', 'Recent', 'All Messages', 'All Issues', and 'Errors Only'. The main log area is titled 'Build target Baffle OSX' and shows the configuration: 'Project Baffle OSX | Configuration Debug | Destination My Mac 64-bit | SDK OS X 10.8'. The log contains several entries, each with a green checkmark icon indicating success. The entries are: 'Compiling MainMenu.xib ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Resources/English.lproj', 'Copy Resources/English.lproj/InfoPlist.strings', 'Copy BaffleIcon.icns ...in /.build/X4DerivedData/Baffle-gnclvcnjqxqjbpdbtkwvykqdykn/Build/Products/Debug/Baffle OSX.app/C...', 'Compile ScratchPadView.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Classes', 'Compile GameBoardView.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Classes', 'Compile BGBafflePieceView.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Classes', 'Compile BGBafflePiece.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/./SharedCode' (with a warning icon and '1' next to it), 'Compile BGBaffleWord.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/./SharedCode', 'Compile BGBaffleWordList.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/./SharedCode', 'Compile GameController.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/./Sha...' (with a warning icon and '1' next to it), and 'Link /.build/X4DerivedData/Baffle-gnclvcnjqxqjbpdbtkwvykqdykn/Build/Products/Debug/Baffle OSX.app/Contents/MacOS/Baffle OSX'. At the bottom, a summary bar shows a yellow warning icon, the text 'Build succeeded 2012-06-06 14.49', and '3 warnings'.

Build target Baffle OSX
Project Baffle OSX | Configuration Debug | Destination My Mac 64-bit | SDK OS X 10.8

- ✓ Compiling MainMenu.xib ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Resources/English.lproj
- ✓ Copy Resources/English.lproj/InfoPlist.strings
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- ✓ Link /.build/X4DerivedData/Baffle-gnclvcnjqxqjbpdbtkwvykqdykn/Build/Products/Debug/Baffle OSX.app/Contents/MacOS/Baffle OSX

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Build Logs in the IDE

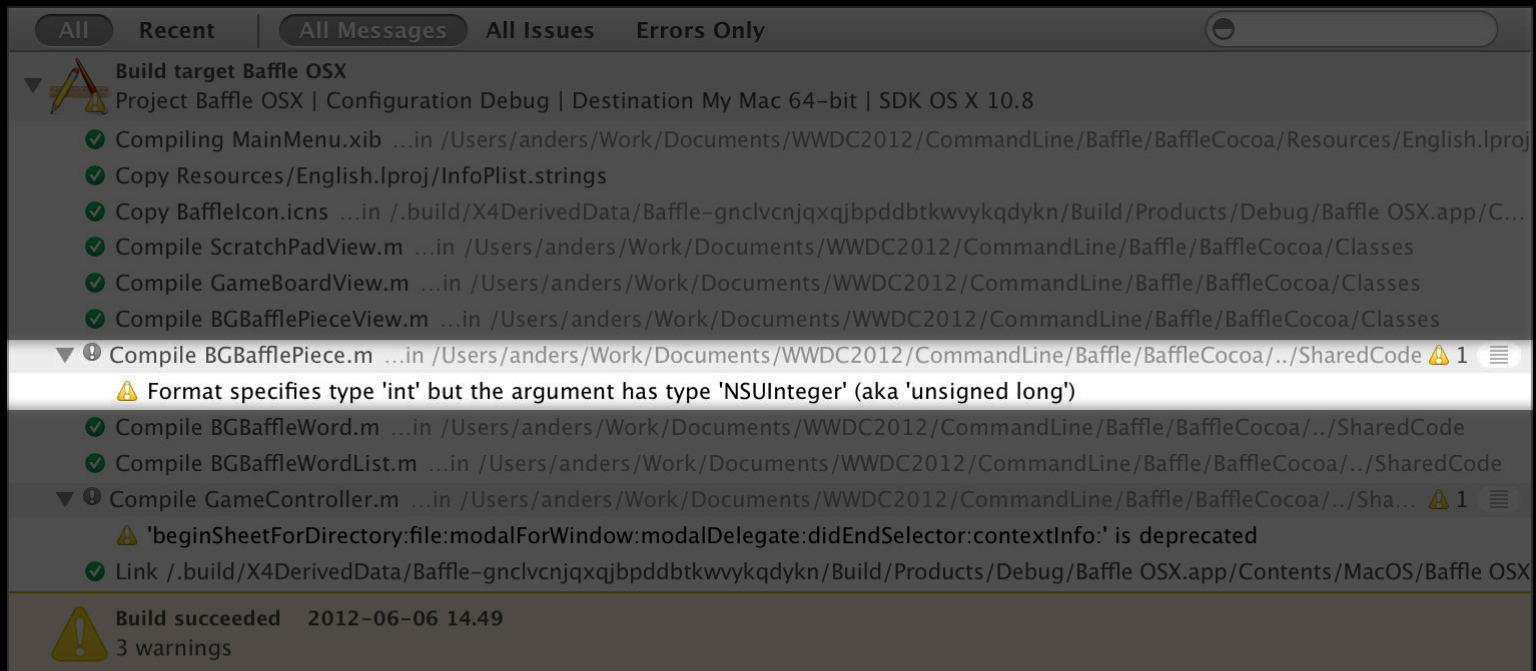
All Recent All Messages All Issues Errors Only

Build target Baffle OSX
Project Baffle OSX | Configuration Debug | Destination My Mac 64-bit | SDK OS X 10.8

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- ✓ Copy BaffleIcon.icns ...in /.build/X4DerivedData/Baffle-gnclvcnjqxqjbpdbtkwvykqdykn/Build/Products/Debug/Baffle OSX.app/C...
- ✓ Compile ScratchPadView.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Classes
- ✓ Compile GameBoardView.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Classes
- ✓ Compile BGBafflePieceView.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Classes
- ▼ ⚠ Compile BGBafflePiece.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/./SharedCode ⚠ 1
- ⚠ Format specifies type 'int' but the argument has type 'NSUInteger' (aka 'unsigned long')
- ✓ Compile BGBaffleWord.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/./SharedCode
- ✓ Compile BGBaffleWordList.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/./SharedCode
- ▼ ⚠ Compile GameController.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/./Sha... ⚠ 1
- ⚠ 'beginSheetForDirectory:file:modalForWindow:modalDelegate:didEndSelector:contextInfo:' is deprecated
- ✓ Link /.build/X4DerivedData/Baffle-gnclvcnjqxqjbpdbtkwvykqdykn/Build/Products/Debug/Baffle OSX.app/Contents/MacOS/Baffle OSX

⚠ Build succeeded 2012-06-06 14.49
3 warnings

Build Logs in the IDE



The screenshot shows the Xcode IDE's build log window. At the top, there are tabs for 'All', 'Recent', 'All Messages', 'All Issues', and 'Errors Only'. The log content is as follows:

- Build target Baffle OSX
- Project Baffle OSX | Configuration Debug | Destination My Mac 64-bit | SDK OS X 10.8
- ✓ Compiling MainMenu.xib ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Resources/English.lproj
- ✓ Copy Resources/English.lproj/InfoPlist.strings
- ✓ Copy BaffleIcon.icns ...in /.build/X4DerivedData/Baffle-gnclvcnjqxqjbpdbtkwvykqdykn/Build/Products/Debug/Baffle OSX.app/C...
- ✓ Compile ScratchPadView.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Classes
- ✓ Compile GameBoardView.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Classes
- ✓ Compile BGBafflePieceView.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Classes
- ⚠ Compile BGBafflePiece.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/./SharedCode ⚠ 1
- ⚠ Format specifies type 'int' but the argument has type 'NSUInteger' (aka 'unsigned long')
- ✓ Compile BGBaffleWord.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/./SharedCode
- ✓ Compile BGBaffleWordList.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/./SharedCode
- ⚠ Compile GameController.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/./Sha... ⚠ 1
- ⚠ 'beginSheetForDirectory:file:modalForWindow:modalDelegate:didEndSelector:contextInfo:' is deprecated
- ✓ Link /.build/X4DerivedData/Baffle-gnclvcnjqxqjbpdbtkwvykqdykn/Build/Products/Debug/Baffle OSX.app/Contents/MacOS/Baffle OSX

At the bottom, a summary bar indicates: **Build succeeded** 2012-06-06 14.49, with 3 warnings.

Build Logs in the IDE

The screenshot shows the Xcode IDE's build log window. At the top, there are tabs for 'All', 'Recent', 'All Messages', 'All Issues', and 'Errors Only'. The main log area is titled 'Build target Baffle OSX' and shows the following steps:

- Project Baffle OSX | Configuration Debug | Destination My Mac 64-bit | SDK OS X 10.8
- ✓ Compiling MainMenu.xib ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Resources/English.lproj
- ✓ Copy Resources/English.lproj/InfoPlist.strings
- ✓ Copy BaffleIcon.icns ...in /.build/X4DerivedData/Baffle-gnclvcnjqxqjbpdbtkwvykqdykn/Build/Products/Debug/Baffle OSX.app/C...
- ✓ Compile ScratchPadView.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Classes
- ✓ Compile GameBoardView.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Classes
- ✓ Compile BGBafflePieceView.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Classes
- ⚠ Compile BGBafflePiece.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/./SharedCode ⚠ 1
- ⚠ Format specifies type 'int' but the argument has type 'NSUInteger' (aka 'unsigned long')
- ✓ Compile BGBaffleWord.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/./SharedCode
- ✓ Compile BGBaffleWordList.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/./SharedCode
- ⚠ Compile GameController.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/./Sha... ⚠ 1
- ⚠ 'beginSheetForDirectory:file:modalForWindow:modalDelegate:didEndSelector:contextInfo:' is deprecated
- ✓ Link /.build/X4DerivedData/Baffle-gnclvcnjqxqjbpdbtkwvykqdykn/Build/Products/Debug/Baffle OSX.app/Contents/MacOS/Baffle OSX

At the bottom, a summary bar indicates: **Build succeeded** 2012-06-06 14.49 with 3 warnings.

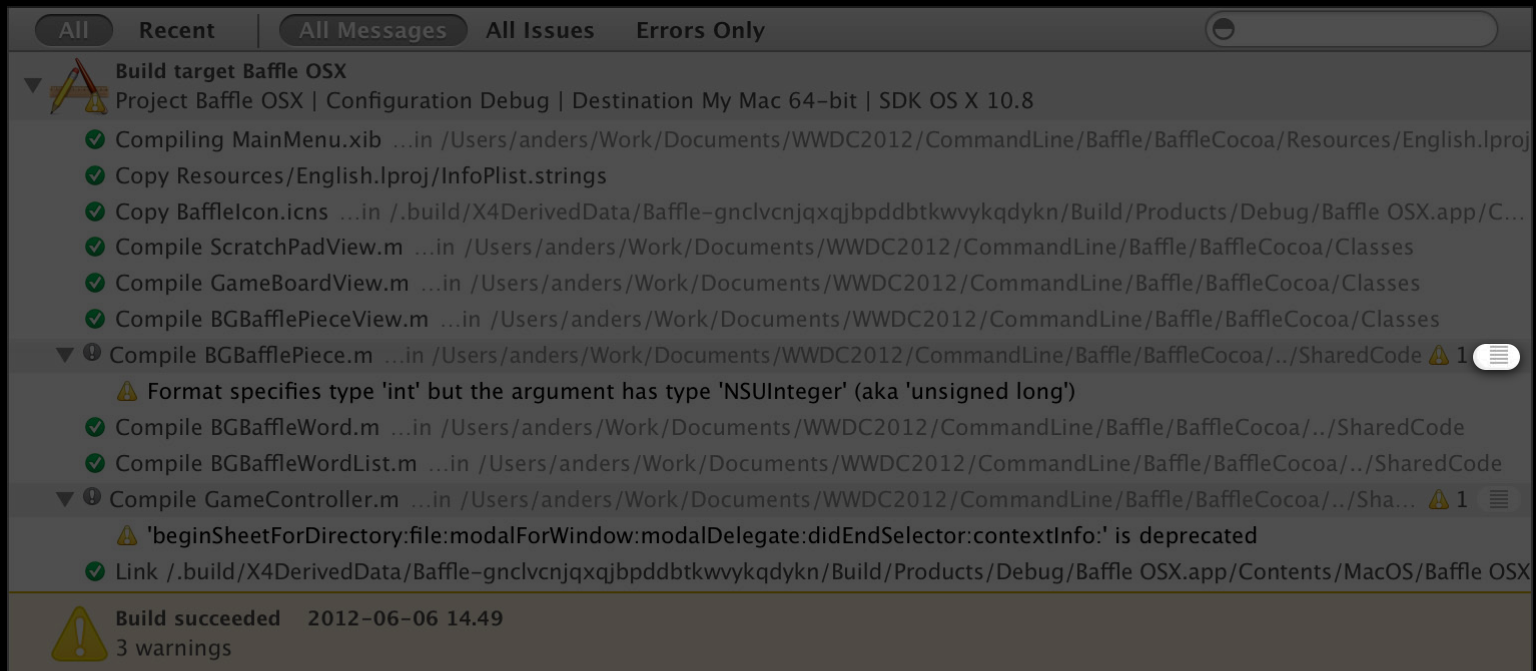
Build Logs in the IDE

The screenshot shows the Xcode IDE's build log window. At the top, there are tabs for 'All', 'Recent', 'All Messages', 'All Issues', and 'Errors Only'. The main log area shows the following details:

- Build target Baffle OSX**
- Project Baffle OSX | Configuration Debug | Destination My Mac 64-bit | SDK OS X 10.8
- Build steps (all successful):
 - Compiling MainMenu.xib ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Resources/English.lproj
 - Copy Resources/English.lproj/InfoPlist.strings
 - Copy BaffleIcon.icns ...in /.build/X4DerivedData/Baffle-gnclvcnjqxqjbpdbtkwvykqdykn/Build/Products/Debug/Baffle OSX.app/C...
 - Compile ScratchPadView.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Classes
 - Compile GameBoardView.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Classes
 - Compile BGBafflePieceView.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Classes
 - Compile BGBafflePiece.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/./SharedCode ⚠️
 - Compile BGBaffleWord.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/./SharedCode
 - Compile BGBaffleWordList.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/./SharedCode
 - Compile GameController.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/./Sha... ⚠️ 1
- Warnings:
 - Format specifies type 'int' but the argument has type 'NSUInteger' (aka 'unsigned long')
 - 'beginSheetForDirectory:file:modalForWindow:modalDelegate:didEndSelector:contextInfo:' is deprecated
- Link /.build/X4DerivedData/Baffle-gnclvcnjqxqjbpdbtkwvykqdykn/Build/Products/Debug/Baffle OSX.app/Contents/MacOS/Baffle OSX

At the bottom, a summary bar indicates: **Build succeeded** 2012-06-06 14.49, with 3 warnings.

Build Logs in the IDE

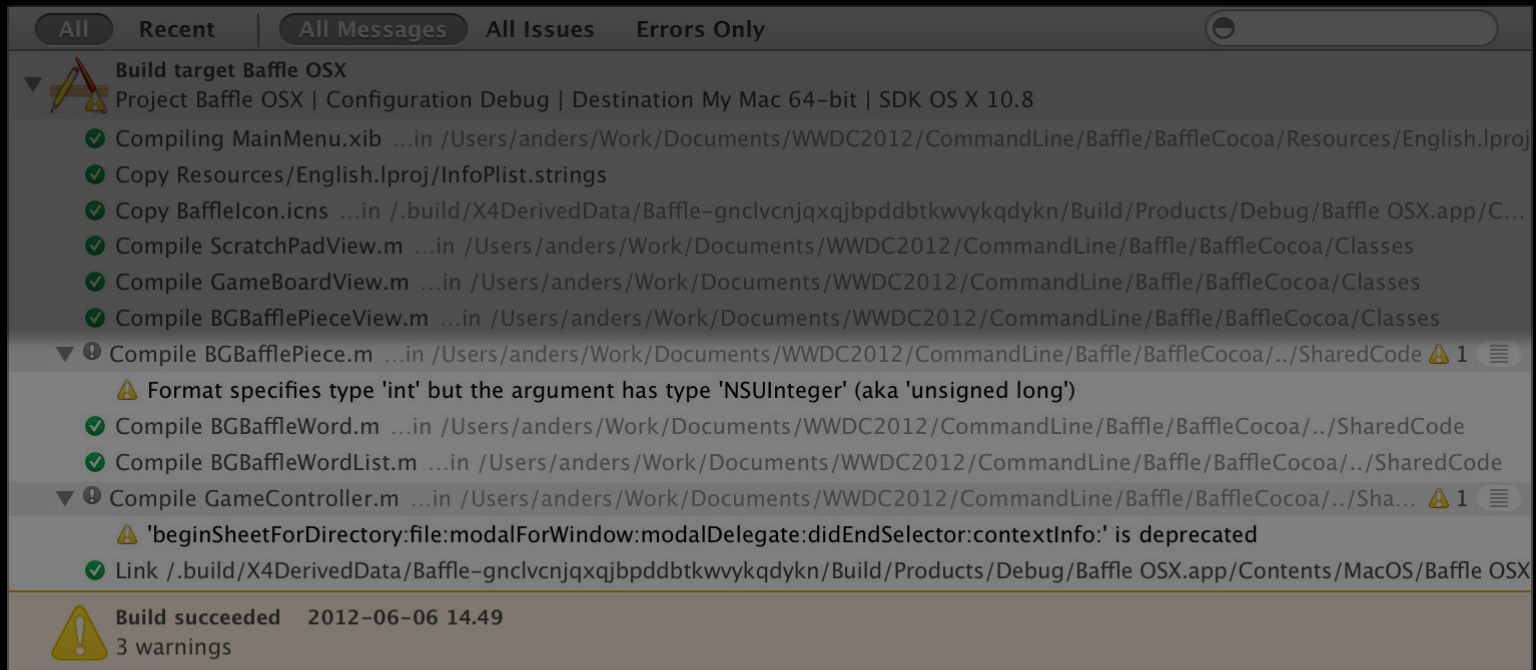


The screenshot shows the Xcode IDE's build log window. At the top, there are tabs for 'All', 'Recent', 'All Messages', 'All Issues', and 'Errors Only'. The main log area displays the following build process:

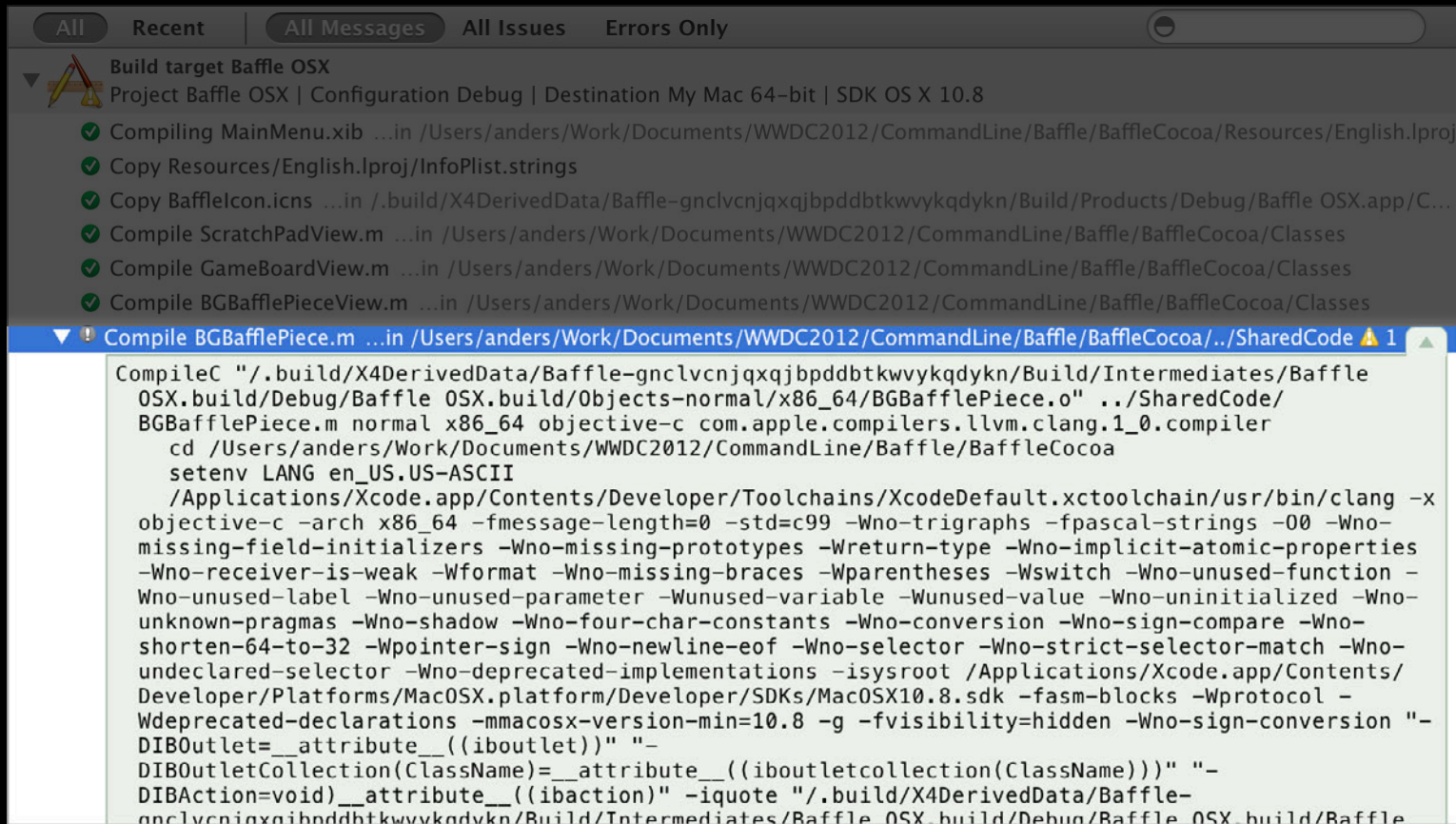
- Build target Baffle OSX
- Project Baffle OSX | Configuration Debug | Destination My Mac 64-bit | SDK OS X 10.8
- ✓ Compiling MainMenu.xib ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Resources/English.lproj
- ✓ Copy Resources/English.lproj/InfoPlist.strings
- ✓ Copy BaffleIcon.icns ...in /.build/X4DerivedData/Baffle-gnclvcnjqxqjbpdbtkwvykqdykn/Build/Products/Debug/Baffle OSX.app/C...
- ✓ Compile ScratchPadView.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Classes
- ✓ Compile GameBoardView.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Classes
- ✓ Compile BGBafflePieceView.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Classes
- ⚠ Compile BGBafflePiece.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/./SharedCode ⚠ 1
- ⚠ Format specifies type 'int' but the argument has type 'NSUInteger' (aka 'unsigned long')
- ✓ Compile BGBaffleWord.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/./SharedCode
- ✓ Compile BGBaffleWordList.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/./SharedCode
- ⚠ Compile GameController.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/./Sha... ⚠ 1
- ⚠ 'beginSheetForDirectory:file:modalForWindow:modalDelegate:didEndSelector:contextInfo:' is deprecated
- ✓ Link /.build/X4DerivedData/Baffle-gnclvcnjqxqjbpdbtkwvykqdykn/Build/Products/Debug/Baffle OSX.app/Contents/MacOS/Baffle OSX

At the bottom, a summary bar indicates: **Build succeeded** 2012-06-06 14.49, with 3 warnings.

Build Logs in the IDE



Build Logs in the IDE



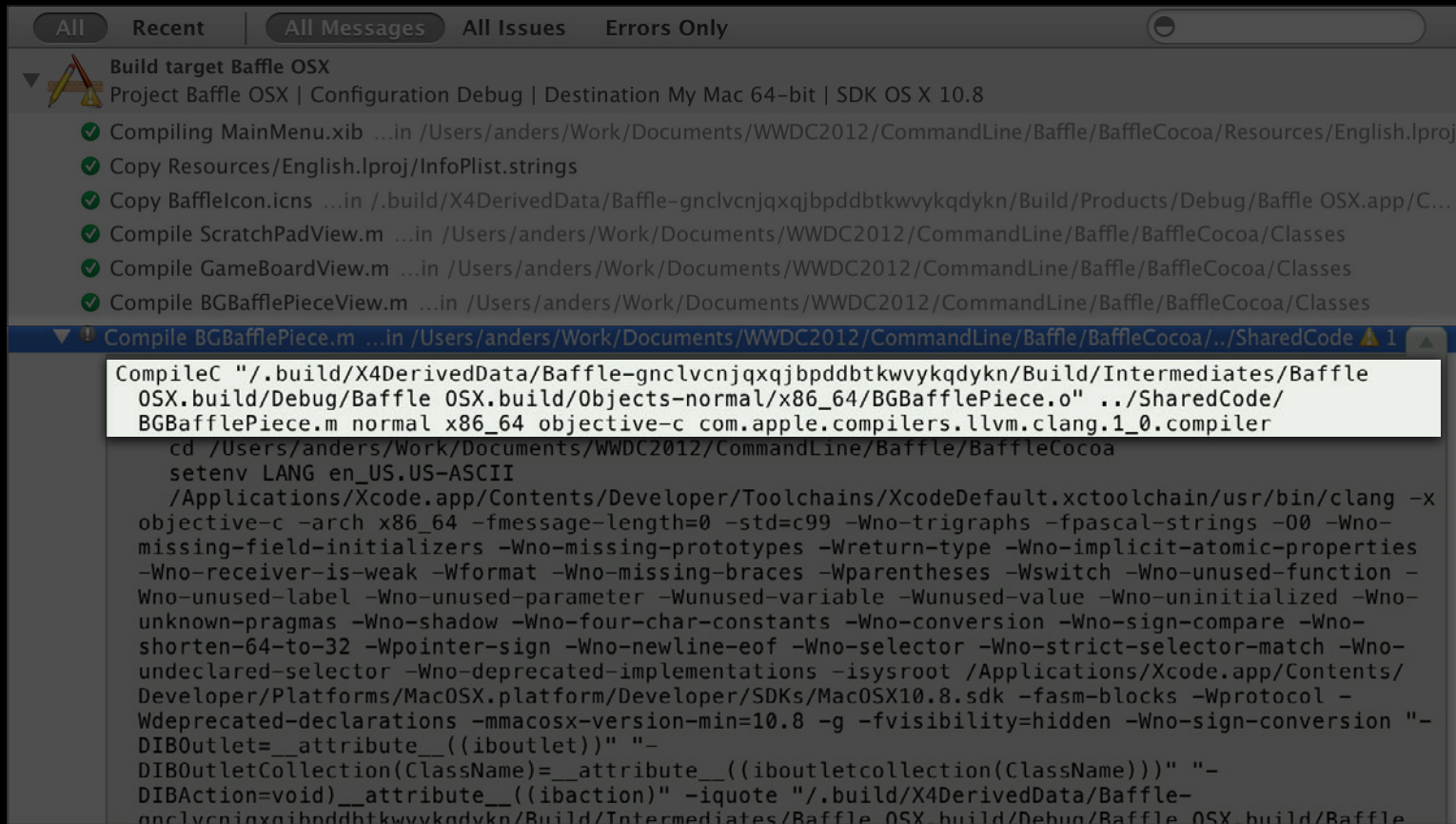
Build target Baffle OSX
Project Baffle OSX | Configuration Debug | Destination My Mac 64-bit | SDK OS X 10.8

- ✓ Compiling MainMenu.xib ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Resources/English.lproj
- ✓ Copy Resources/English.lproj/InfoPlist.strings
- ✓ Copy BaffleIcon.icns ...in /.build/X4DerivedData/Baffle-gnclvcnjqxqjbpdhbkwykqdykn/Build/Products/Debug/Baffle OSX.app/C...
- ✓ Compile ScratchPadView.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Classes
- ✓ Compile GameBoardView.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Classes
- ✓ Compile BGBafflePieceView.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Classes

▼ ! Compile BGBafflePiece.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/./SharedCode 1 ▲

```
CompileC "/.build/X4DerivedData/Baffle-gnclvcnjqxqjbpdhbkwykqdykn/Build/Intermediates/Baffle OSX.build/Debug/Baffle OSX.build/Objects-normal/x86_64/BGBafflePiece.o" ../SharedCode/BGBafflePiece.m normal x86_64 objective-c com.apple.compilers.llvm.clang.1_0.compiler
cd /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa
setenv LANG en_US.US-ASCII
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/bin/clang -x objective-c -arch x86_64 -fmessage-length=0 -std=c99 -Wno-trigraphs -fpascal-strings -O0 -Wno-missing-field-initializers -Wno-missing-prototypes -Wreturn-type -Wno-implicit-atomic-properties -Wno-receiver-is-weak -Wformat -Wno-missing-braces -Wparentheses -Wswitch -Wno-unused-function -Wno-unused-label -Wno-unused-parameter -Wunused-variable -Wunused-value -Wno-uninitialized -Wno-unknown-pragmas -Wno-shadow -Wno-four-char-constants -Wno-conversion -Wno-sign-compare -Wno-shorten-64-to-32 -Wpointer-sign -Wno-newline-eof -Wno-selector -Wno-strict-selector-match -Wno-undeclared-selector -Wno-deprecated-implementations -isysroot /Applications/Xcode.app/Contents/Developer/Platforms/MacOSX.platform/Developer/SDKs/MacOSX10.8.sdk -fasm-blocks -Wprotocol -Wdeprecated-declarations -mmacosx-version-min=10.8 -g -fvisibility=hidden -Wno-sign-conversion "-DIBOutlet=__attribute__((iboutlet))" "-DIBOutletCollection(Classname)=__attribute__((iboutletcollection(Classname)))" "-DIBAction=void)__attribute__((ibaction)" -quote "/.build/X4DerivedData/Baffle-gnclvcnjqxqjbpdhbkwykqdykn/Build/Intermediates/Baffle OSX.build/Debug/Baffle OSX.build/Baffle
```

Build Logs in the IDE



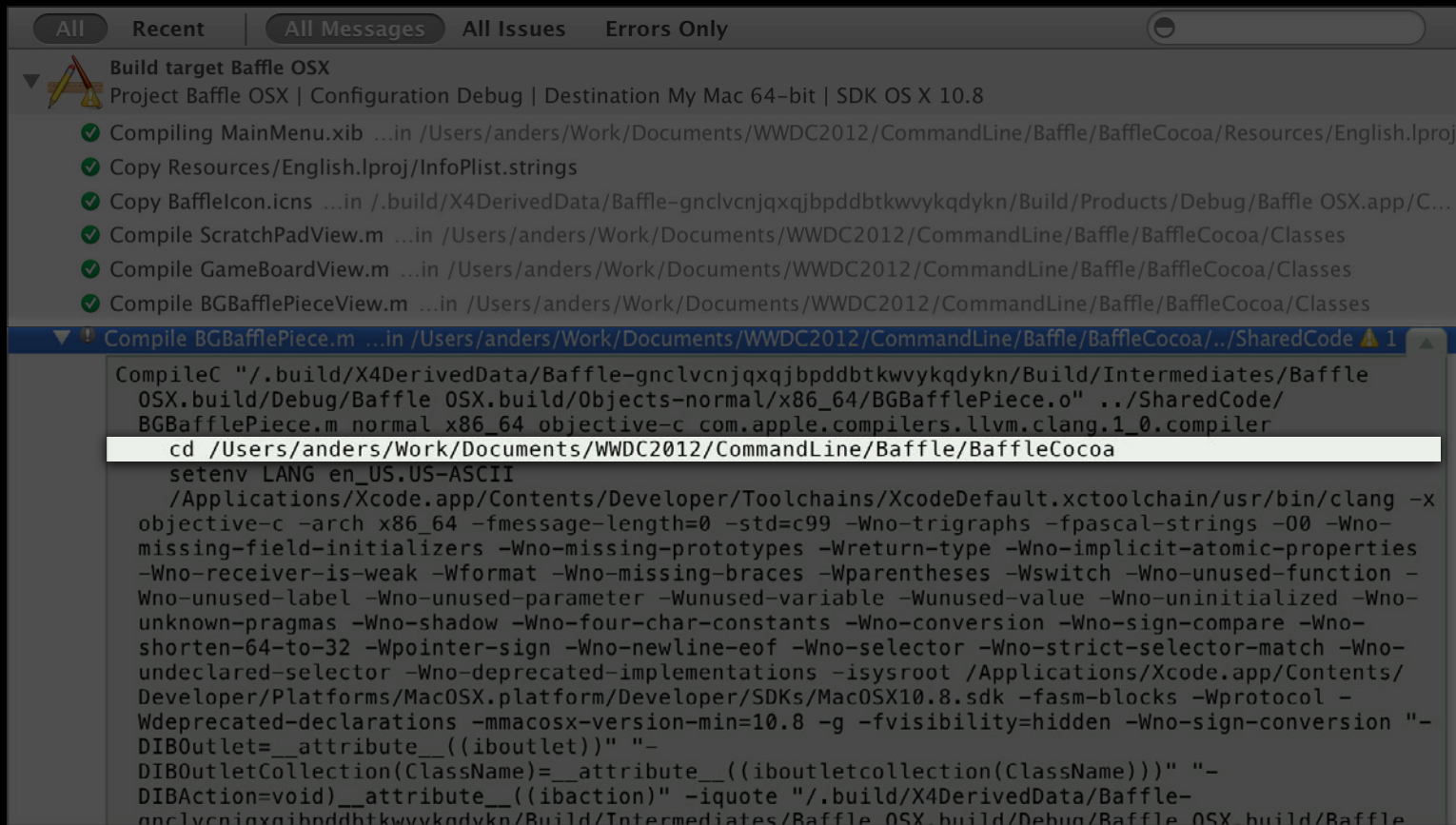
Build target Baffle OSX
Project Baffle OSX | Configuration Debug | Destination My Mac 64-bit | SDK OS X 10.8

- ✓ Compiling MainMenu.xib ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Resources/English.lproj
- ✓ Copy Resources/English.lproj/InfoPlist.strings
- ✓ Copy BaffleIcon.icns ...in /.build/X4DerivedData/Baffle-gnclvcnjqxqjbpdhbtkwvykqdykn/Build/Products/Debug/Baffle OSX.app/C...
- ✓ Compile ScratchPadView.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Classes
- ✓ Compile GameBoardView.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Classes
- ✓ Compile BGBafflePieceView.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Classes

▼ **Compile BGBafflePiece.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/./SharedCode** ⚠ 1

```
CompileC "/.build/X4DerivedData/Baffle-gnclvcnjqxqjbpdhbtkwvykqdykn/Build/Intermediates/Baffle OSX.build/Debug/Baffle OSX.build/Objects-normal/x86_64/BGBafflePiece.o" ../SharedCode/BGBafflePiece.m normal x86_64 objective-c com.apple.compilers.llvm.clang.1_0.compiler
cd /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa
setenv LANG en_US.US-ASCII
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/bin/clang -x objective-c -arch x86_64 -fmessage-length=0 -std=c99 -Wno-trigraphs -fpascal-strings -O0 -Wno-missing-field-initializers -Wno-missing-prototypes -Wreturn-type -Wno-implicit-atomic-properties -Wno-receiver-is-weak -Wformat -Wno-missing-braces -Wparentheses -Wswitch -Wno-unused-function -Wno-unused-label -Wno-unused-parameter -Wunused-variable -Wunused-value -Wno-uninitialized -Wno-unknown-pragmas -Wno-shadow -Wno-four-char-constants -Wno-conversion -Wno-sign-compare -Wno-shorten-64-to-32 -Wpointer-sign -Wno-newline-eof -Wno-selector -Wno-strict-selector-match -Wno-undeclared-selector -Wno-deprecated-implementations -isysroot /Applications/Xcode.app/Contents/Developer/Platforms/MacOSX.platform/Developer/SDKs/MacOSX10.8.sdk -fasm-blocks -Wprotocol -Wdeprecated-declarations -mmacosx-version-min=10.8 -g -fvisibility=hidden -Wno-sign-conversion "-DIBOutlet=__attribute__((iboutlet))" "-DIBOutletCollection(Classname)=__attribute__((iboutletcollection(Classname)))" "-DIBAction=void)__attribute__((ibaction)" -iquote "/.build/X4DerivedData/Baffle-gnclvcnjqxqjbpdhbtkwvykqdykn/Build/Intermediates/Baffle OSX.build/Debug/Baffle OSX.build/Baffle
```

Build Logs in the IDE



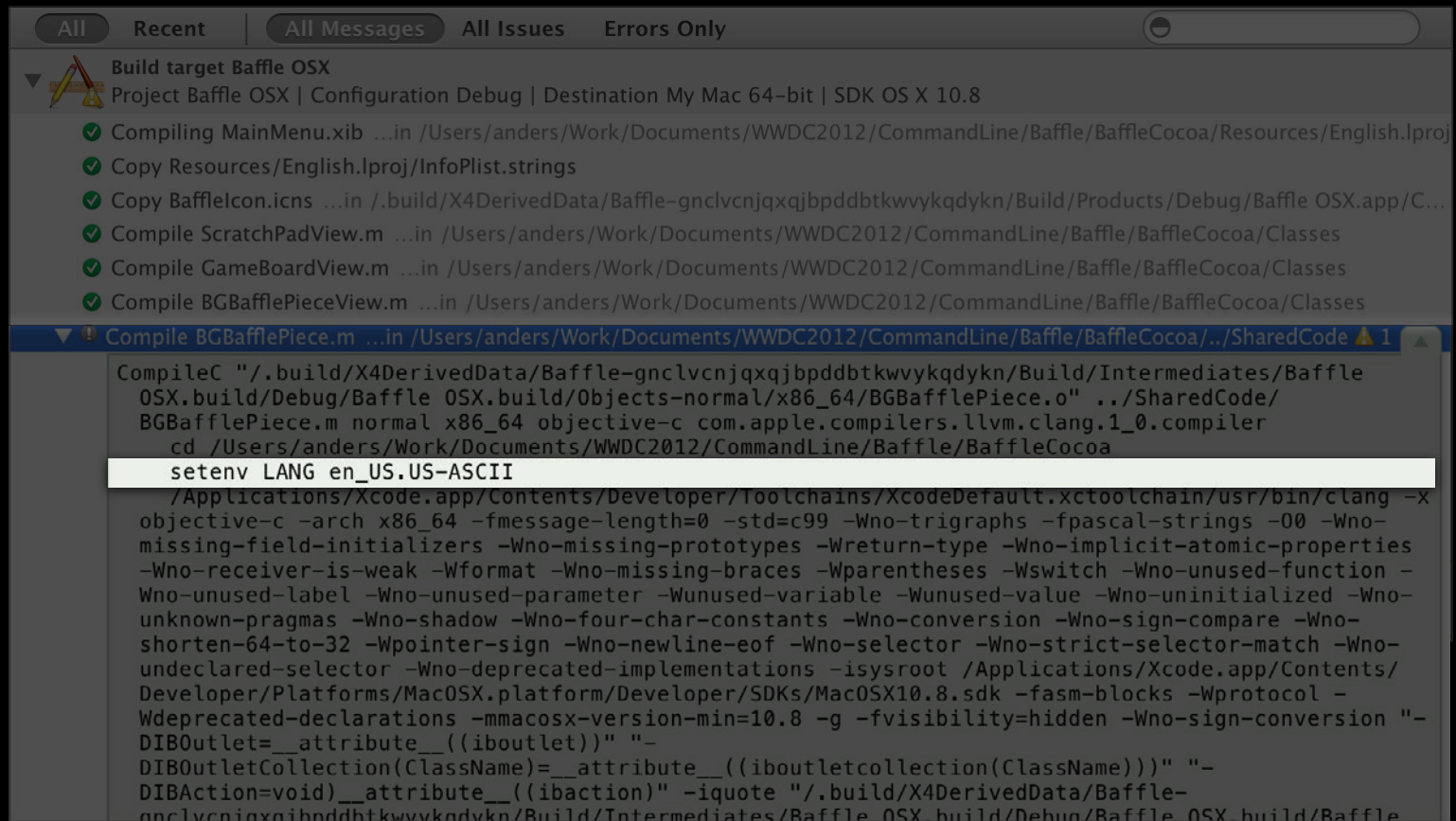
The screenshot shows the Xcode IDE's build log window. At the top, there are tabs for 'All', 'Recent', 'All Messages', 'All Issues', and 'Errors Only'. The main content area shows a tree view of build messages for the target 'Build target Baffle OSX'. The messages are as follows:

- Project Baffle OSX | Configuration Debug | Destination My Mac 64-bit | SDK OS X 10.8
- ✓ Compiling MainMenu.xib ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Resources/English.lproj
- ✓ Copy Resources/English.lproj/InfoPlist.strings
- ✓ Copy BaffleIcon.icns ...in /.build/X4DerivedData/Baffle-gnclvcnjxqjbpdbtkwvykqdykn/Build/Products/Debug/Baffle OSX.app/C...
- ✓ Compile ScratchPadView.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Classes
- ✓ Compile GameBoardView.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Classes
- ✓ Compile BGBafflePieceView.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Classes
- ⚠ Compile BGBafflePiece.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/./SharedCode 1

The selected message shows the following command and output:

```
CompileC "/.build/X4DerivedData/Baffle-gnclvcnjxqjbpdbtkwvykqdykn/Build/Intermediates/Baffle OSX.build/Debug/Baffle OSX.build/Objects-normal/x86_64/BGBafflePiece.o" ../SharedCode/BGBafflePiece.m normal x86_64 objective-c com.apple.compilers.llvm.clang.1_0.compiler
cd /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa
setenv LANG en_US.UTF-8
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/bin/clang -x objective-c -arch x86_64 -fmessage-length=0 -std=c99 -Wno-trigraphs -fpascal-strings -O0 -Wno-missing-field-initializers -Wno-missing-prototypes -Wreturn-type -Wno-implicit-atomic-properties -Wno-receiver-is-weak -Wformat -Wno-missing-braces -Wparentheses -Wswitch -Wno-unused-function -Wno-unused-label -Wno-unused-parameter -Wunused-variable -Wunused-value -Wno-uninitialized -Wno-unknown-pragmas -Wno-shadow -Wno-four-char-constants -Wno-conversion -Wno-sign-compare -Wno-shorten-64-to-32 -Wpointer-sign -Wno-newline-eof -Wno-selector -Wno-strict-selector-match -Wno-undeclared-selector -Wno-deprecated-implementations -isysroot /Applications/Xcode.app/Contents/Developer/Platforms/MacOSX.platform/Developer/SDKs/MacOSX10.8.sdk -fasm-blocks -Wprotocol -Wdeprecated-declarations -mmacosx-version-min=10.8 -g -fvisibility=hidden -Wno-sign-conversion "-DIBOutlet=__attribute__((iboutlet))" "-DIBOutletCollection(Classname)=__attribute__((iboutletcollection(Classname)))" "-DIBAction=void)__attribute__((ibaction)" -quote "/.build/X4DerivedData/Baffle-gnclvcnjxqjbpdbtkwvykqdykn/Build/Intermediates/Baffle OSX.build/Debug/Baffle OSX.build/Baffle
```


Build Logs in the IDE



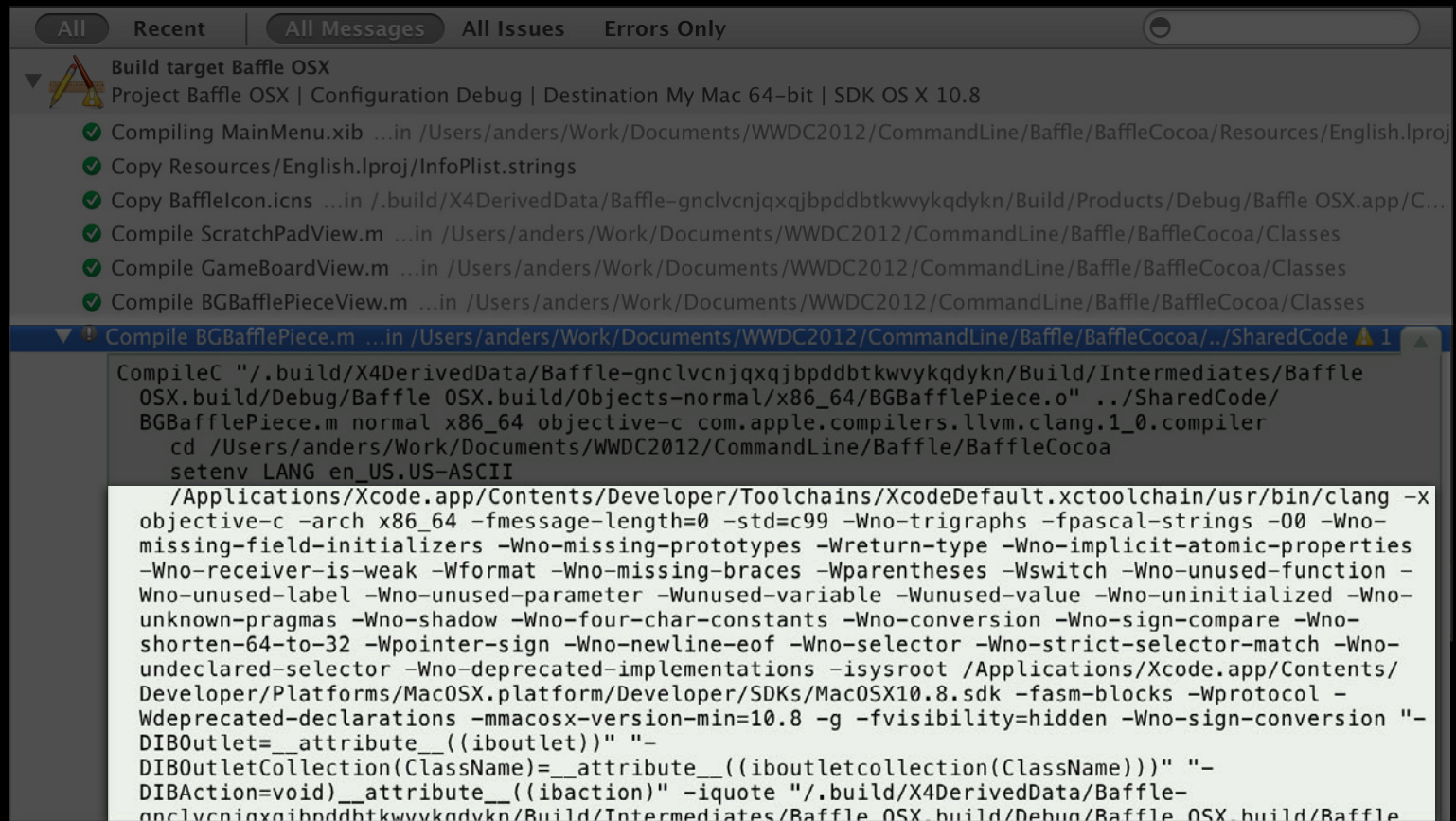
Build target Baffle OSX
Project Baffle OSX | Configuration Debug | Destination My Mac 64-bit | SDK OS X 10.8

- ✓ Compiling MainMenu.xib ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Resources/English.lproj
- ✓ Copy Resources/English.lproj/InfoPlist.strings
- ✓ Copy BaffleIcon.icns ...in /.build/X4DerivedData/Baffle-gnclvcnjqxqjbpdbtkwvykqdykn/Build/Products/Debug/Baffle OSX.app/C...
- ✓ Compile ScratchPadView.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Classes
- ✓ Compile GameBoardView.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Classes
- ✓ Compile BGBafflePieceView.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/Classes

▼ **Compile BGBafflePiece.m ...in /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa/./SharedCode** ⚠ 1

```
CompileC "/.build/X4DerivedData/Baffle-gnclvcnjqxqjbpdbtkwvykqdykn/Build/Intermediates/Baffle OSX.build/Debug/Baffle OSX.build/Objects-normal/x86_64/BGBafflePiece.o" ../SharedCode/BGBafflePiece.m normal x86_64 objective-c com.apple.compilers.llvm.clang.1_0.compiler  
cd /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa  
setenv LANG en_US.US-ASCII  
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/bin/clang -x objective-c -arch x86_64 -fmessage-length=0 -std=c99 -Wno-trigraphs -fpascal-strings -O0 -Wno-missing-field-initializers -Wno-missing-prototypes -Wreturn-type -Wno-implicit-atomic-properties -Wno-receiver-is-weak -Wformat -Wno-missing-braces -Wparentheses -Wswitch -Wno-unused-function -Wno-unused-label -Wno-unused-parameter -Wunused-variable -Wunused-value -Wno-uninitialized -Wno-unknown-pragmas -Wno-shadow -Wno-four-char-constants -Wno-conversion -Wno-sign-compare -Wno-shorten-64-to-32 -Wpointer-sign -Wno-newline-eof -Wno-selector -Wno-strict-selector-match -Wno-undeclared-selector -Wno-deprecated-implementations -isysroot /Applications/Xcode.app/Contents/Developer/Platforms/MacOSX.platform/Developer/SDKs/MacOSX10.8.sdk -fasm-blocks -Wprotocol -Wdeprecated-declarations -mmacosx-version-min=10.8 -g -fvisibility=hidden -Wno-sign-conversion "-DIBOutlet=__attribute__((iboutlet))" "-DIBOutletCollection(Classname)=__attribute__((iboutletcollection(Classname)))" "-DIBAction=void)__attribute__((ibaction)" -iquote "/.build/X4DerivedData/Baffle-gnclvcnjqxqjbpdbtkwvykqdykn/Build/Intermediates/Baffle OSX.build/Debug/Baffle OSX.build/Baffle
```

Build Logs in the IDE



The screenshot shows the Xcode IDE's build log window. At the top, there are tabs for 'All', 'Recent', 'All Messages', 'All Issues', and 'Errors Only'. The log is for the build target 'Baffle OSX' in 'Project Baffle OSX | Configuration Debug | Destination My Mac 64-bit | SDK OS X 10.8'. The log shows several successful compilation steps, each marked with a green checkmark. The final step, which is highlighted in blue, is 'Compile BGBafflePiece.m'. The log text for this step is as follows:

```
CompileC "/.build/X4DerivedData/Baffle-gnclvcnjqxqjbpdbtkwvykqdykn/Build/Intermediates/Baffle OSX.build/Debug/Baffle OSX.build/Objects-normal/x86_64/BGBafflePiece.o" ../SharedCode/BGBafflePiece.m normal x86_64 objective-c com.apple.compilers.llvm.clang.1_0.compiler cd /Users/anders/Work/Documents/WWDC2012/CommandLine/Baffle/BaffleCocoa setenv LANG en_US.US-ASCII /Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/bin/clang -x objective-c -arch x86_64 -fmessage-length=0 -std=c99 -Wno-trigraphs -fpascal-strings -O0 -Wno-missing-field-initializers -Wno-missing-prototypes -Wreturn-type -Wno-implicit-atomic-properties -Wno-receiver-is-weak -Wformat -Wno-missing-braces -Wparentheses -Wswitch -Wno-unused-function -Wno-unused-label -Wno-unused-parameter -Wunused-variable -Wunused-value -Wno-uninitialized -Wno-unknown-pragmas -Wno-shadow -Wno-four-char-constants -Wno-conversion -Wno-sign-compare -Wno-shorten-64-to-32 -Wpointer-sign -Wno-newline-eof -Wno-selector -Wno-strict-selector-match -Wno-undeclared-selector -Wno-deprecated-implementations -isysroot /Applications/Xcode.app/Contents/Developer/Platforms/MacOSX.platform/Developer/SDKs/MacOSX10.8.sdk -fasm-blocks -Wprotocol -Wdeprecated-declarations -mmacosx-version-min=10.8 -g -fvisibility=hidden -Wno-sign-conversion "-DIBOutlet=__attribute__((iboutlet))" "-DIBOutletCollection(className)=__attribute__((iboutletcollection(className)))" "-DIBAction=void)__attribute__((ibaction)" -iquote "/.build/X4DerivedData/Baffle-gnclvcnjqxqjbpdbtkwvykqdykn/Build/Intermediates/Baffle OSX.build/Debug/Baffle OSX.build/Baffle
```

Where Do the Outputs Go?

Kind	Contents	Controlling Build Setting
Intermediates	Compiled Code ("Objects")	OBJROOT
	Generated Sources	
	Precompiled Headers	SHARED_PRECOMPS_DIR
Debug Products	Products, in debug locations	SYMR00T
	Debug Symbols (.dSYMs)	
Release Products	Products, in release locations	DSTR00T

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Customizing Your Project

Controlling the Build

- Schemes

Controlling the Build

- Schemes
- Overriding build settings

Controlling the Build

- Schemes
- Overriding build settings
 - Configuration files

Controlling the Build

- Schemes
- Overriding build settings
 - Configuration files
 - Architectures

Controlling the Build

- Schemes
- Overriding build settings
 - Configuration files
 - Architectures
 - SDKs

Controlling the Build

- Schemes
- Overriding build settings
 - Configuration files
 - Architectures
 - SDKs
 - Other build settings

Schemes

- A scheme defines:

Schemes

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 - A collection of targets to build

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Schemes

- A scheme defines:
 - A collection of targets to build
 - A configuration to use when building
 - An optional collection of tests to execute
 - User-defined pre- and post-processing actions

Listing the Schemes

A terminal window with a dark green background and a silver border. The prompt character is a white greater-than sign (>) followed by a yellow vertical bar.

```
> |
```

Listing the Schemes

```
> xcodebuild -workspace Baffle.xcworkspace -list
```

Listing the Schemes

```
> xcodebuild -workspace Baffle.xcworkspace -list
```

```
Information about workspace "Baffle":
```

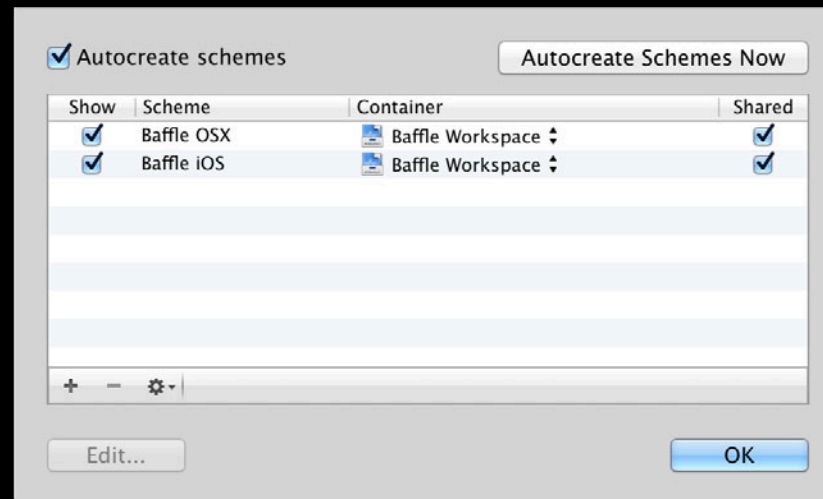
```
Schemes:
```

```
  Baffle OSX
```

```
  Baffle iOS
```

```
> █
```

Listing the Schemes



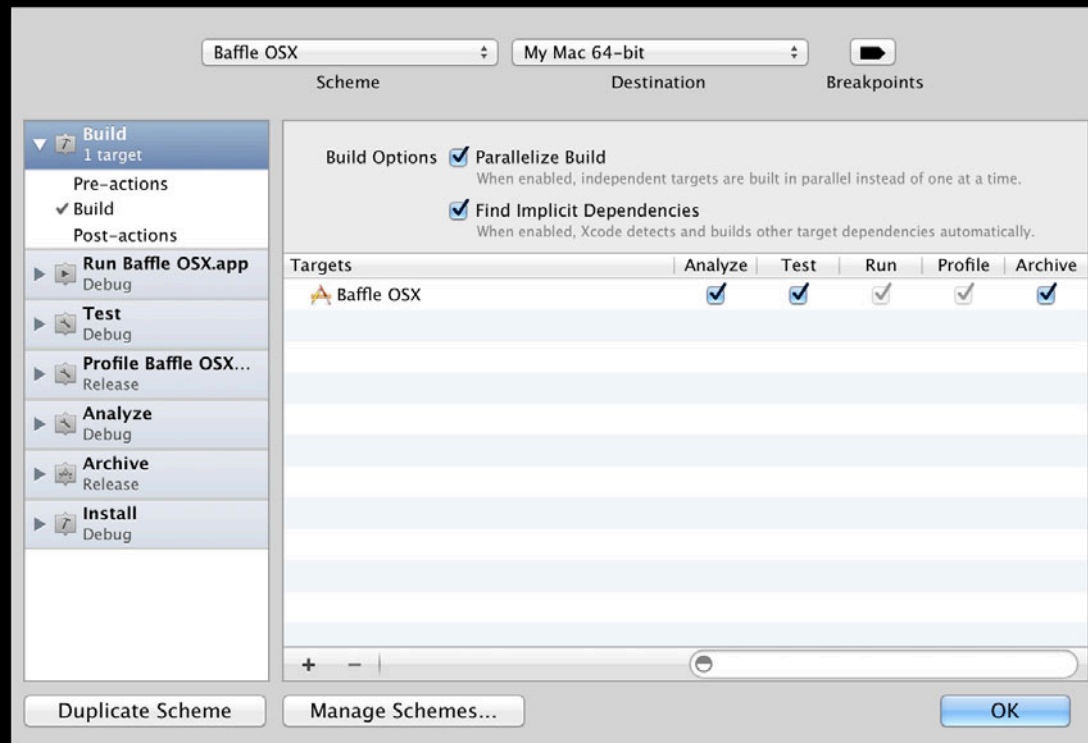
Using Schemes

- Configure in Xcode
 - Build configuration
 - Scheme actions
 - Other options

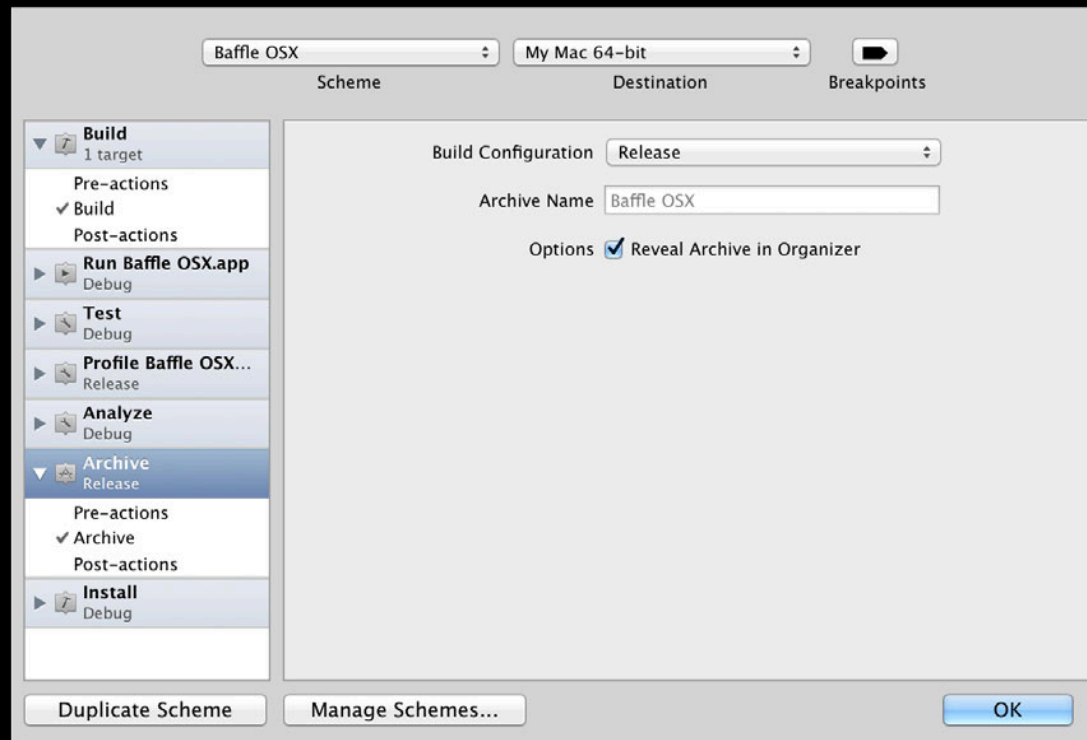
Using Schemes

- Configure in Xcode
 - Build configuration
 - Scheme actions
 - Other options
- Use in `xcodebuild`
 - Use `-scheme` flag to select scheme to use

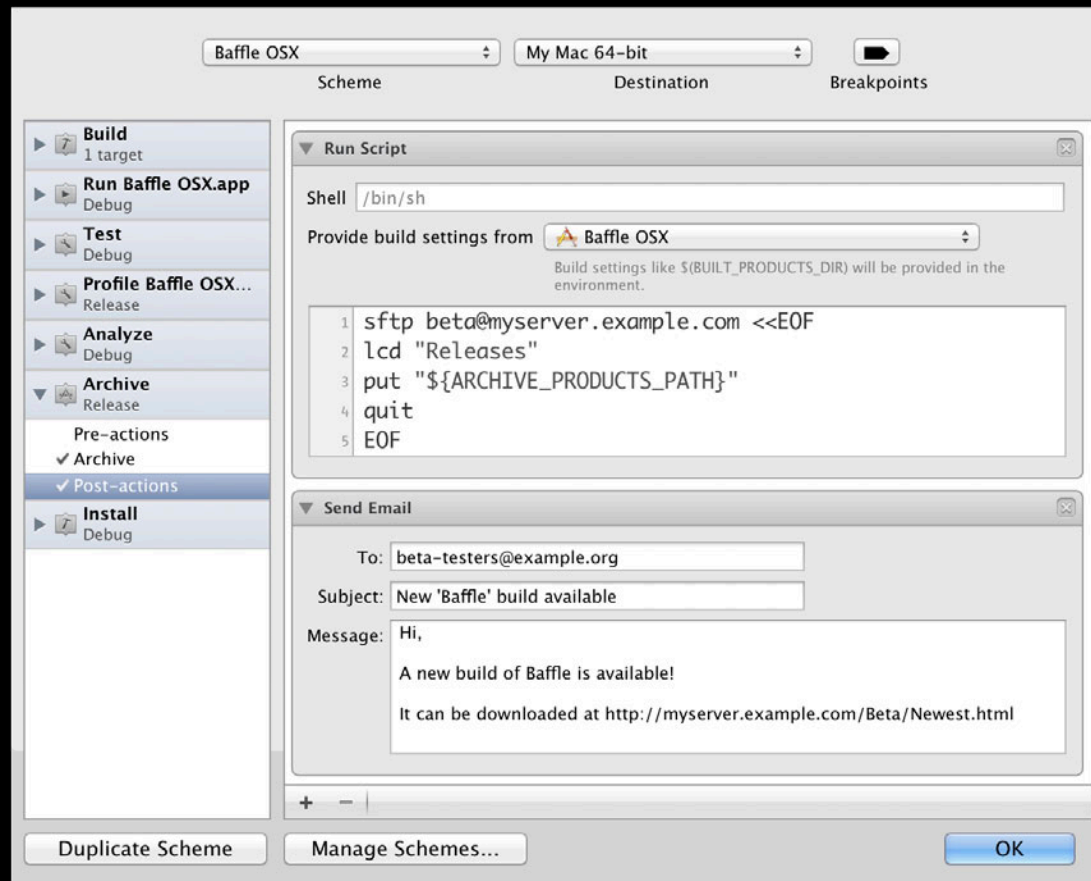
Customizing Schemes



Customizing Schemes



Customizing Schemes



Specifying a Scheme



> █

Specifying a Scheme

```
> xcodebuild -workspace Baffle -scheme "Baffle OSX" █
```

Listing the SDKs

A terminal window with a dark green background and a silver border. A white prompt character '>' is followed by a yellow vertical bar representing the cursor.

> |

Listing the SDKs

```
> xcodebuild -showsdk
```

Listing the SDKs

```
> xcodebuild -showsdk  
OS X SDKs:  
  Mac OS X 10.7      -sdk macosx10.7  
  OS X 10.8         -sdk macosx10.8  
  
iOS SDKs:  
  iOS 6.0           -sdk iphoneos6.0  
  
iOS Simulator SDKs:  
  Simulator - iOS 6.0 -sdk iphonesimulator6.0  
  
> █
```


Specifying an SDK



> █

Specifying an SDK

```
> xcodebuild -workspace Baffle -sdk macosx10.8
```

Build Settings

Build Settings

- “Knobs and switches” of the build system

Build Settings

- “Knobs and switches” of the build system
- View and edit in Build Settings editor in IDE

Build Settings

- “Knobs and switches” of the build system
- View and edit in Build Settings editor in IDE
- Override by passing on `xcodebuild` command line

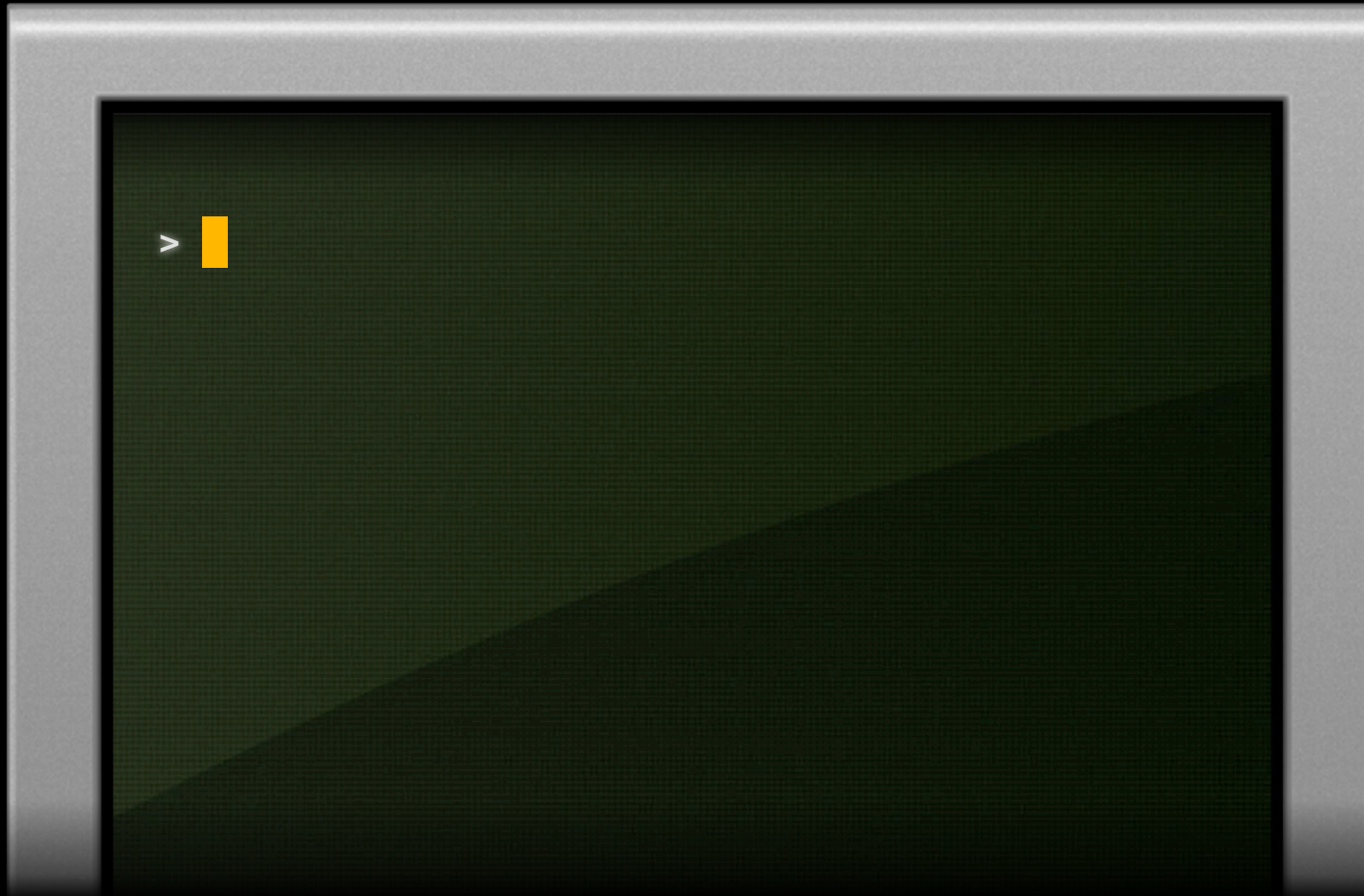
Build Settings

- “Knobs and switches” of the build system
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- Set in environment to provide defaults

Build Settings

- “Knobs and switches” of the build system
- View and edit in Build Settings editor in IDE
- Override by passing on `xcodebuild` command line
- Set in environment to provide defaults
- Use `-showBuildSettings` option to `xcodebuild`

Seeing Values of Build Settings



Seeing Values of Build Settings

```
> xcodebuild -workspace Baffle -showBuildSettings
```

Seeing Values of Build Settings

```
> xcodebuild -workspace Baffle -showBuildSettings
```

```
Build settings for action build & target "Baffle OSX"
```

```
ACTION = build  
ALWAYS_SEARCH_USER_PATHS = NO  
APPLY_RULES_IN_COPY_FILES = NO  
ARCHS = i386  
ARCHS_STANDARD_32_64_BIT = x86_64 i386  
ARCHS_STANDARD_32_BIT = i386  
ARCHS_STANDARD_64_BIT = x86_64  
AVAILABLE_PLATFORMS = macosx iphoneos  
BUILD_DIR = ./build/Baffle/Build/Products  
CONFIGURATION = Debug  
COPYING_PRESERVES_HFS_DATA = NO
```

```
:
```

Overriding Build Settings



Overriding Build Settings

```
> xcodebuild -workspace Baffle OBJROOT=/tmp/objects
```

Overriding Build Settings

```
> xcodebuild -workspace Baffle OBJROOT=/tmp/objects
```

or

```
> █
```

Overriding Build Settings

```
> xcodebuild -workspace Baffle OBJROOT=/tmp/objects
```

or

```
> export OBJROOT=/tmp/objects
```

Overriding Build Settings

```
> xcodebuild -workspace Baffle OBJROOT=/tmp/objects
```

or

```
> export OBJROOT=/tmp/objects
```

```
> █
```


Overriding Build Settings

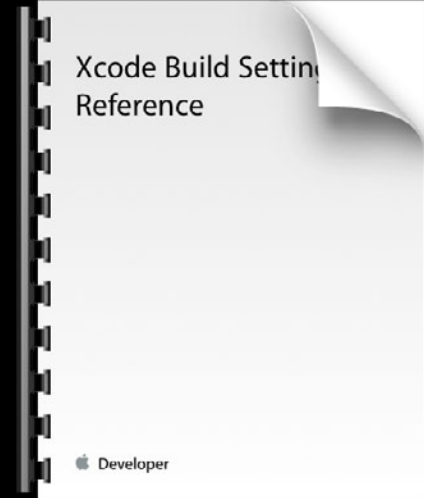
```
> xcodebuild -workspace Baffle OBJROOT=/tmp/objects
```

or

```
> export OBJROOT=/tmp/objects
```

```
> xcodebuild -workspace Baffle █
```

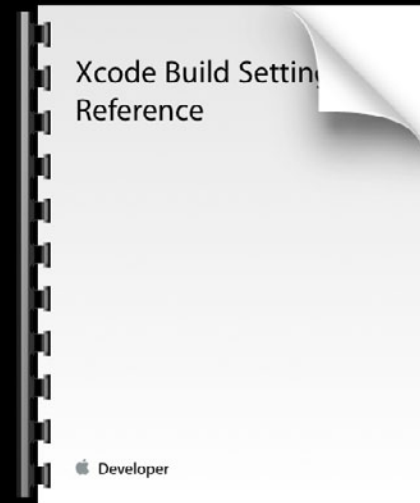
What Build Settings Are Available?



Xcode Build Setting Reference

What Build Settings Are Available?

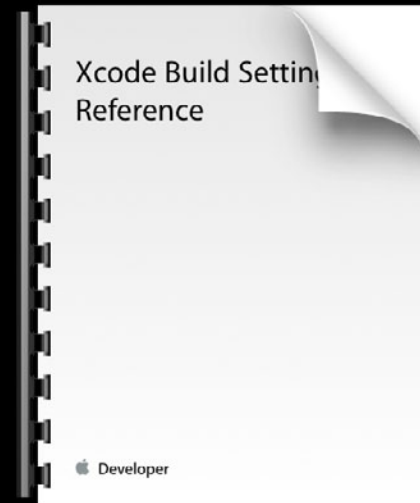
- Xcode built-in documentation



Xcode Build Setting Reference

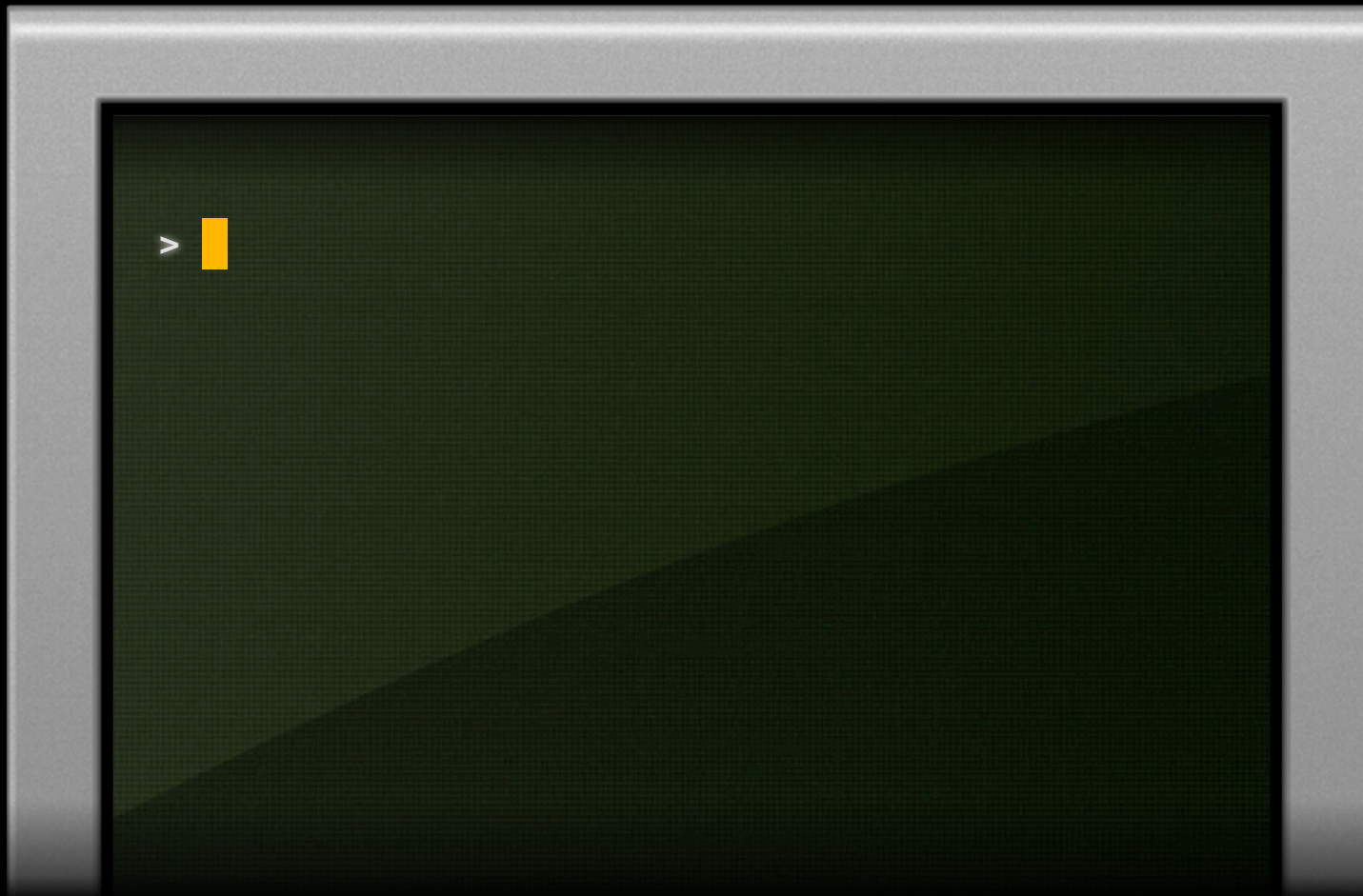
What Build Settings Are Available?

- Xcode built-in documentation
- Developer resources



Xcode Build Setting Reference

Putting It All Together



Putting It All Together

```
> xcodebuild \
```

Putting It All Together

```
> xcodebuild \  
-workspace Baffle.xcworkspace \
```

Putting It All Together

```
> xcodebuild \  
  -workspace Baffle.xcworkspace \  
  -scheme "Baffle OSX" \
```


Putting It All Together

```
> xcodebuild \  
  -workspace Baffle.xcworkspace \  
  -scheme "Baffle OSX" \  
  -sdk macosx10.8 \
```

Putting It All Together

```
> xcodebuild \  
  -workspace Baffle.xcworkspace \  
  -scheme "Baffle OSX" \  
  -sdk macosx10.8 \  
  OBJROOT=/tmp/objects \
```

Putting It All Together

```
> xcodebuild \  
  -workspace Baffle.xcworkspace \  
  -scheme "Baffle OSX" \  
  -sdk macosx10.8 \  
  OBJROOT=/tmp/objects \  
  SYMROOT=/tmp/symbols \
```

Putting It All Together

```
> xcodebuild \  
  -workspace Baffle.xcworkspace \  
  -scheme "Baffle OSX" \  
  -sdk macosx10.8 \  
  OBJROOT=/tmp/objects \  
  SYMROOT=/tmp/symbols \  
  DSTROOT=/tmp/distrib
```

Which Xcode.app?



Xcode 4.3

Which Xcode.app?



Xcode 4.3



Xcode 4.5 Preview

Which Xcode.app?

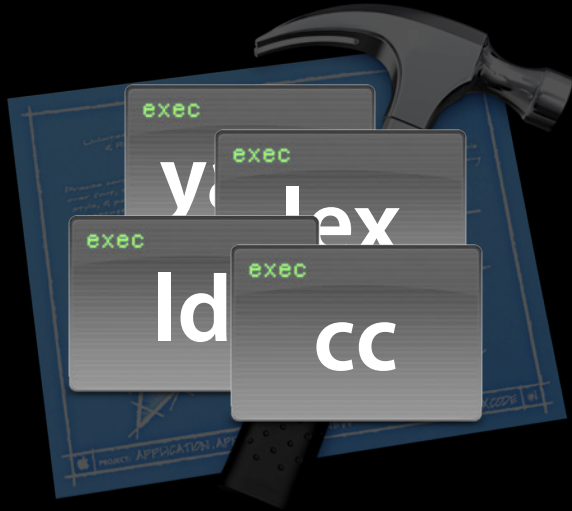


Xcode 4.3

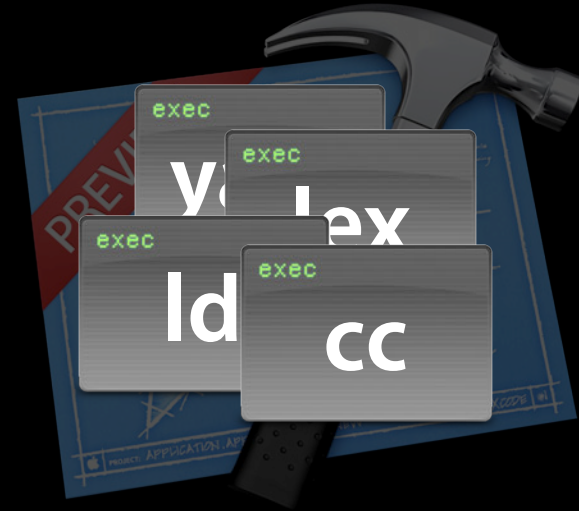


Xcode 4.5 Preview

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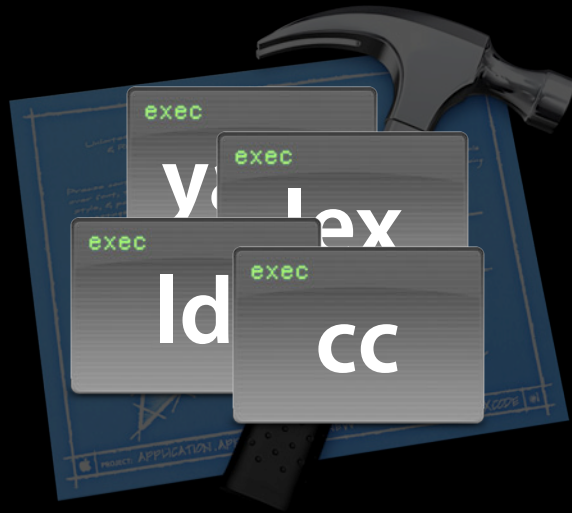


Xcode 4.3

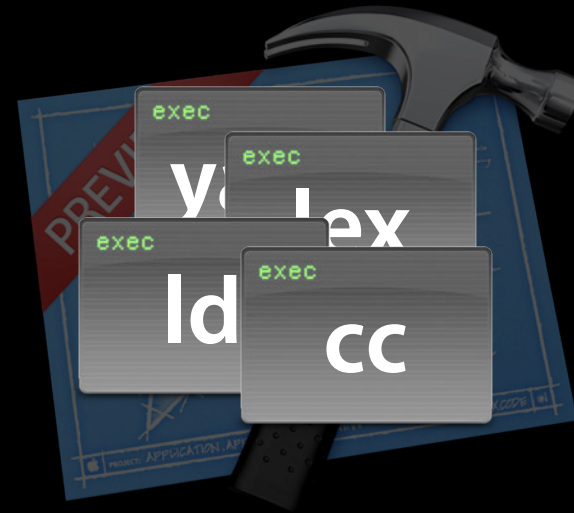


Xcode 4.5 Preview

Which Xcode.app?



Xcode 4.3



Xcode 4.5 Preview

Use `xcode-select`

A terminal window with a dark green background and a silver border. In the top-left corner, there is a white prompt character '>' followed by a yellow vertical bar representing a cursor.

> |

Use `xcode-select`

```
> xcode-select -print-path
```

Use `xcode-select`

```
> xcode-select -print-path  
/Applications/Xcode.app/Contents/Developer  
> █
```

Use `xcode-select`

```
> xcode-select -print-path  
/Applications/Xcode.app/Contents/Developer  
> xcode-select -switch /Applications/Xcode45-DP1.app
```

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/Applications/Xcode.app/Contents/Developer  
  
> xcode-select -switch /Applications/Xcode45-DP1.app  
> █
```

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> xcode-select -switch /Applications/Xcode45-DP1.app  
> xcode-select -print-path  
/Applications/Xcode45-DP1.app/Contents/Developer  
  
> █
```


Use `xcode-select`

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/Applications/Xcode45-DP1.app/Contents/Developer  
  
> xcodebuild -version █
```

Use `xcode-select`

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/Applications/Xcode.app/Contents/Developer  
  
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> xcode-select -print-path  
/Applications/Xcode45-DP1.app/Contents/Developer  
  
> xcodebuild -version  
Xcode 4.5  
Build version 4G78z  
  
> █
```

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What Is xcrun?

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 - Usage: `xcrun -find tool`
- Mode 2: Run the tool with a full command line
 - Usage: `xcrun tool arg1 arg2 ...`

Using xcrun

A terminal window with a dark green background and a silver border. A yellow cursor is positioned on the left side of the terminal, next to a white greater-than sign (>).

>

Using xcrun

```
> xcrun -find cc
```

Using xcrun

```
> xcrun -find cc  
/Applications/Xcode.app/Contents/Developer/Toolchains/  
XcodeDefault.xctoolchain/usr/bin/cc  
  
> █
```

Using xcrun

```
> xcrun -find cc  
/Applications/Xcode.app/Contents/Developer/Toolchains/  
XcodeDefault.xctoolchain/usr/bin/cc  
  
> xcrun cc -c source.c -o source.o
```


Using xcrun

```
> xcrun -find cc
/Applications/Xcode.app/Contents/Developer/Toolchains/
XcodeDefault.xctoolchain/usr/bin/cc

> xcrun cc -c source.c -o source.o
source.c:22:23: warning: unused parameter 'baz'
int foo (int bar, int baz)
                    ^
1 warning generated.

> █
```

Using xcrun

A terminal window with a dark green background and a silver border. A yellow cursor is positioned on the left side of the terminal, next to a white greater-than sign (>).

>

Using xcrun

```
> xcrun -find git
```

Using xcrun

```
> xcrun -find git
```

```
/Applications/Xcode45-DP1.app/Contents/Developer/  
usr/bin/git
```

```
> █
```

Using xcrun

```
> xcrun -find git
```

```
/Applications/Xcode45-DP1.app/Contents/Developer/  
usr/bin/git
```

```
> xcrun git --version
```

Using xcrun

```
> xcrun -find git
```

```
/Applications/Xcode45-DP1.app/Contents/Developer/  
usr/bin/git
```

```
> xcrun git --version
```

```
git version 1.7.9.6 (Apple Git-31)
```

```
> █
```

Using xcrun

```
> xcrun -find git
/Applications/Xcode45-DP1.app/Contents/Developer/
usr/bin/git

> xcrun git --version
git version 1.7.9.6 (Apple Git-31)

> alias git="xcrun git" █
```

Using xcrun

```
> xcrun -find git
/Applications/Xcode45-DP1.app/Contents/Developer/
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git version 1.7.9.6 (Apple Git-31)

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> █
```


Using xcrun

```
> xcrun -find git
/Applications/Xcode45-DP1.app/Contents/Developer/
usr/bin/git

> xcrun git --version
git version 1.7.9.6 (Apple Git-31)

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```

Using xcrun

```
> xcrun -find git
/Applications/Xcode45-DP1.app/Contents/Developer/
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> git --version
git version 1.7.9.6 (Apple Git-31)

> █
```

Directly Invoking a Specific `xcodebuild`



> █

Directly Invoking a Specific `xcodebuild`

```
> export DEVELOPER_DIR=/Applications/Xcode45-DP1.app/  
    Contents/Developer
```

Directly Invoking a Specific `xcodebuild`

```
> export DEVELOPER_DIR=/Applications/Xcode45-DP1.app/  
    Contents/Developer
```

```
> █
```

Directly Invoking a Specific xcodebuild

```
> export DEVELOPER_DIR=/Applications/Xcode45-DP1.app/  
  Contents/Developer  
  
> xcrun -find xcodebuild
```

Directly Invoking a Specific `xcodebuild`

```
> export DEVELOPER_DIR=/Applications/Xcode45-DP1.app/  
    Contents/Developer  
  
> xcrun -find xcodebuild  
/Applications/Xcode45-DP1.app/Contents/Developer/usr/  
bin/xcodebuild  
  
> █
```

Directly Invoking a Specific `xcodebuild`

```
> export DEVELOPER_DIR=/Applications/Xcode45-DP1.app/  
    Contents/Developer  
  
> xcrun -find xcodebuild  
/Applications/Xcode45-DP1.app/Contents/Developer/usr/  
bin/xcodebuild  
  
> xcodebuild
```


Directly Invoking a Specific `xcodebuild`

```
> export DEVELOPER_DIR=/Applications/Xcode45-DP1.app/
  Contents/Developer

> xcrun -find xcodebuild

/Applications/Xcode45-DP1.app/Contents/Developer/usr/
bin/xcodebuild

> xcodebuild

=== BUILD NATIVE TARGET Baffle OSX OF PROJECT Baffle
OSX WITH CONFIGURATION Debug ===

ProcessPCH build/Intermediates/PrecompiledHeaders/Baff
leCocoa_Prefix-dkhujstkyhmqbdihrzilncxtxa/BaffleCoco
a_Prefix.pch.pth OtherSources/BaffleCocoa_Prefix.pch n
ormal x86_64 objective-c com.apple.compilers.llvm.clan
```

Automating `xcodebuild`

Using Xcode with Continuous Integration

Daniel Dunbar

System Tools Engineer

What Is Continuous Integration?

- Continuous Integration (CI) refers to a continuous process for integrating and applying quality checks to software development

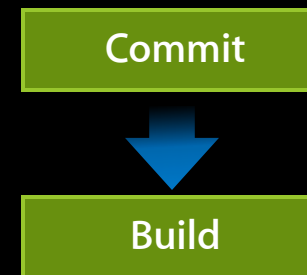
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Commit

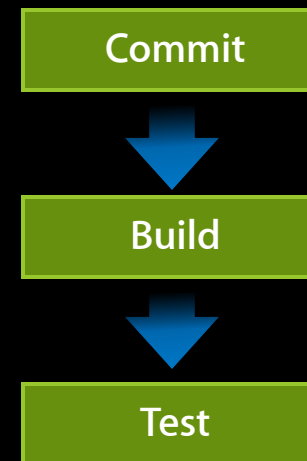
What Is Continuous Integration?

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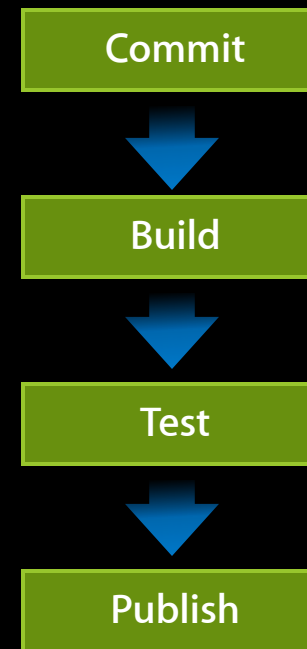
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Continuous Integration Example

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Continuous Integration Example

- Common problem
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 - Code shared between two products (e.g. OS X and iOS)
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- Solution
 - Use `xcodebuild` and Continuous Integration

Automating xcodebuild

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`DSTROOT`, `OBJROOT`, `SYMR00T`, `SHARED_PRECOMPS_DIR`

Automating xcodebuild

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- Make sure builds are run as a user who has accepted the license agreement; alternately, can accept for all users

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sudo xcodebuild -license
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- Ensure access to appropriate development certificates

Demo

Automating project builds

Working Outside Xcode

Working Outside Xcode

- Many projects may not supply native Xcode projects

Working Outside Xcode

- Many projects may not supply native Xcode projects
 - Legacy code base

Working Outside Xcode

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 - Understanding the command line tools package

The Command Line Tools Package

The Command Line Tools Package

- What is the command line tools package?

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The Command Line Tools Package

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- How to install the command line tools package?
- When should it be installed?

What Is the Package?



What Is the Package?



- New in Xcode 4.3

What Is the Package?



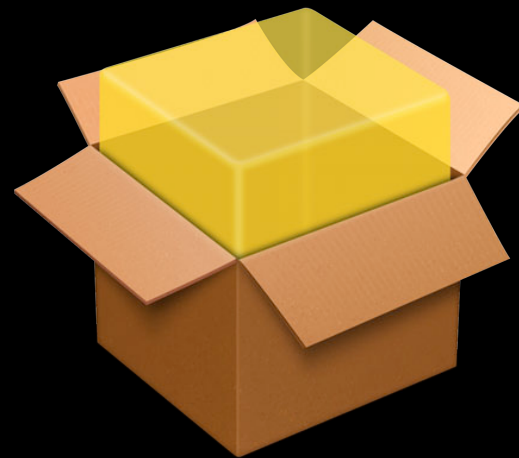
- New in Xcode 4.3
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What Is the Package?



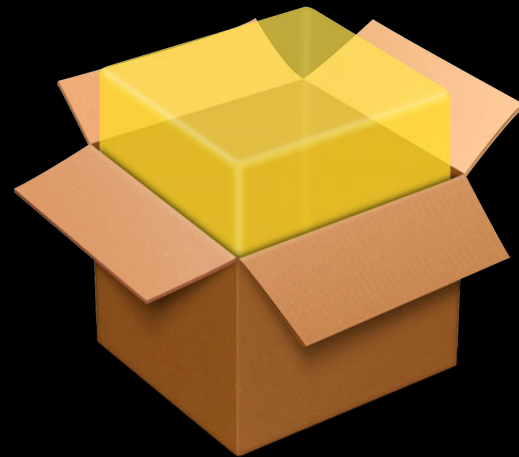
- New in Xcode 4.3
- Separate package for doing extensive command line development
- Supported mechanism for UNIX-style development

What Does It Contain?



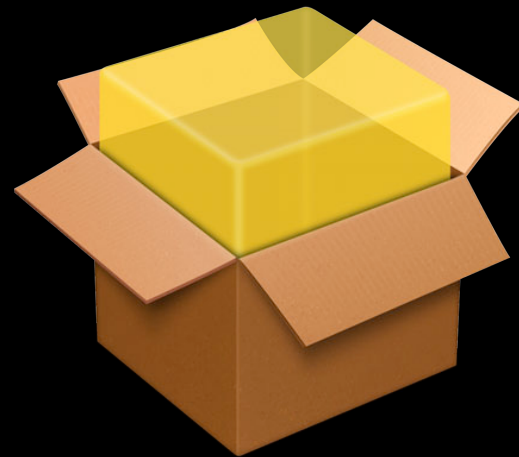
What Does It Contain?

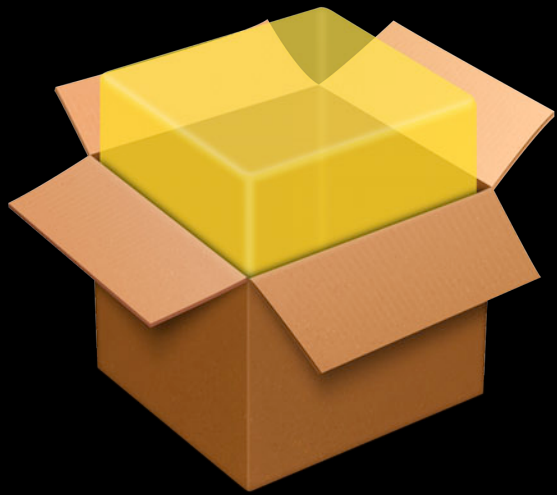
- Contains everything for command line development

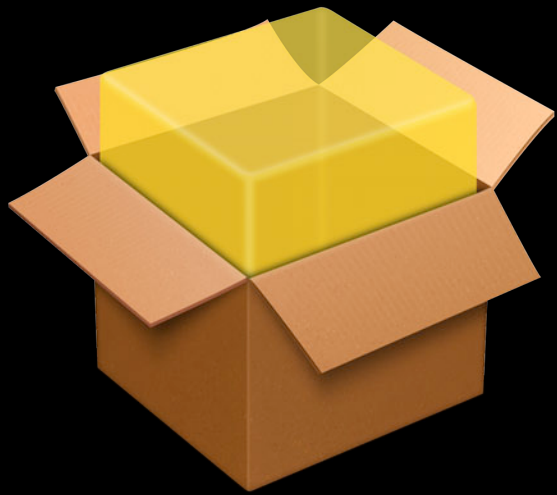


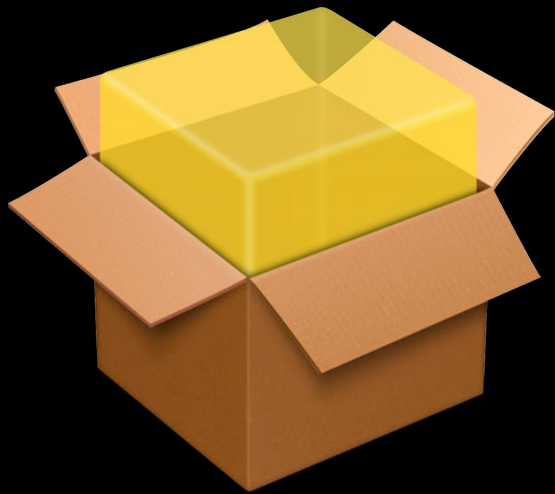
What Does It Contain?

- Contains everything for command line development
- Bundled at the standard UNIX location (/usr)





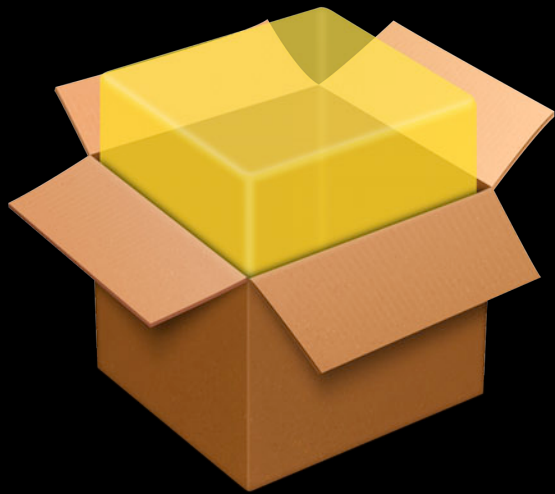




Tools

OSX / SDK

Documentation
(man Pages)



Tools

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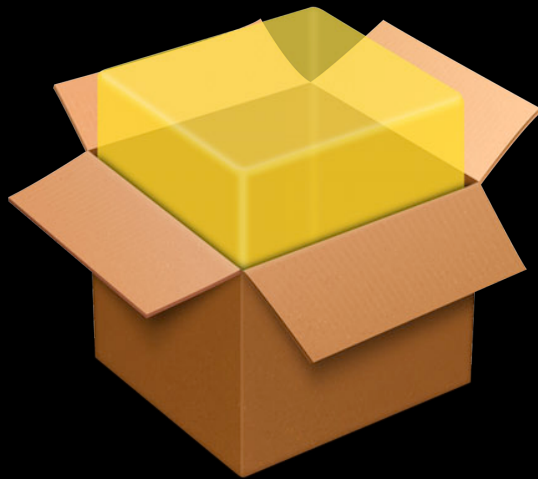
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Development Tools

Debugging Tools

Source Control

Obtaining the Command Line Tools




Download from
Developer Resources



Install from Xcode

Obtaining the Command Line Tools

As a standalone download



The screenshot shows the Apple Developer website. At the top, there is a navigation bar with the Apple logo and the word "Developer". To the right of the logo are links for "Technologies", "Resources", "Programs", and "Support". Below the navigation bar is a section titled "Resources for Apple Developers". This section is divided into two main categories: "iOS" and "OS X".

iOS
Access a range of resources for developing, designing and distributing apps for iPad, iPhone and iPod touch.

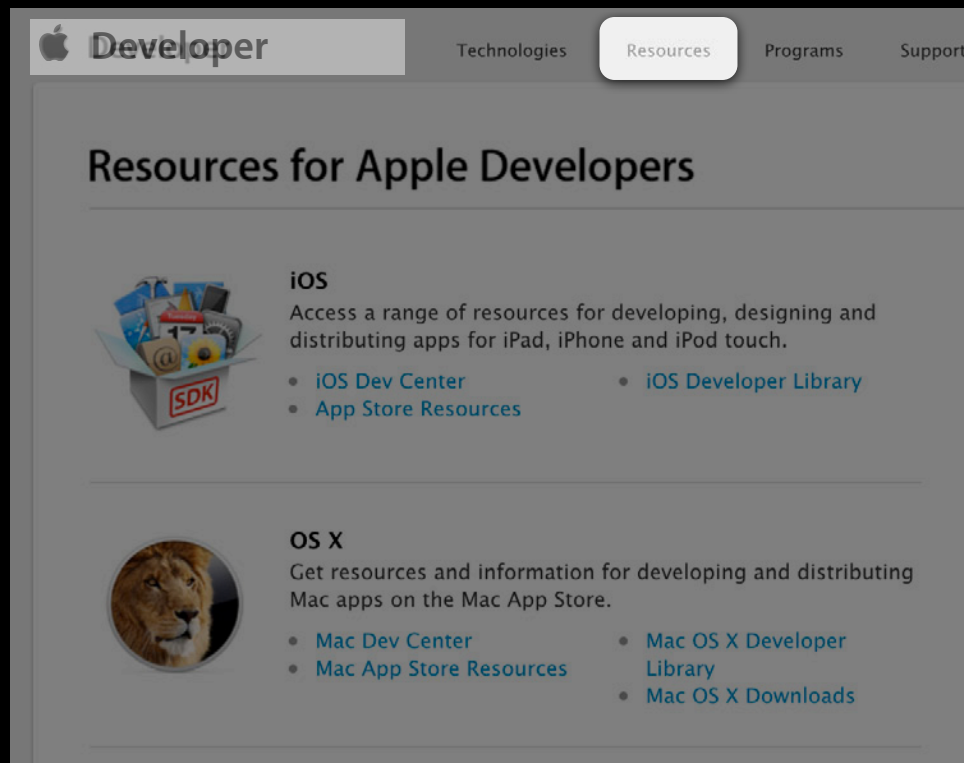
- [iOS Dev Center](#)
- [App Store Resources](#)
- [iOS Developer Library](#)

OS X
Get resources and information for developing and distributing Mac apps on the Mac App Store.

- [Mac Dev Center](#)
- [Mac App Store Resources](#)
- [Mac OS X Developer Library](#)
- [Mac OS X Downloads](#)

Obtaining the Command Line Tools


As a standalone download




The screenshot shows the Apple Developer website's 'Resources' section. The navigation bar includes 'Developer', 'Technologies', 'Resources' (highlighted), 'Programs', and 'Support'. The main heading is 'Resources for Apple Developers'. There are two main sections: 'iOS' and 'OS X'. The 'iOS' section features an icon of a box labeled 'SDK' containing various app icons and a description: 'Access a range of resources for developing, designing and distributing apps for iPad, iPhone and iPod touch.' It lists four links: 'iOS Dev Center', 'App Store Resources', 'iOS Developer Library', and 'iOS Developer Library'. The 'OS X' section features a circular image of a lion and a description: 'Get resources and information for developing and distributing Mac apps on the Mac App Store.' It lists four links: 'Mac Dev Center', 'Mac App Store Resources', 'Mac OS X Developer Library', and 'Mac OS X Downloads'.

Developer Technologies **Resources** Programs Support

Resources for Apple Developers

 **iOS**
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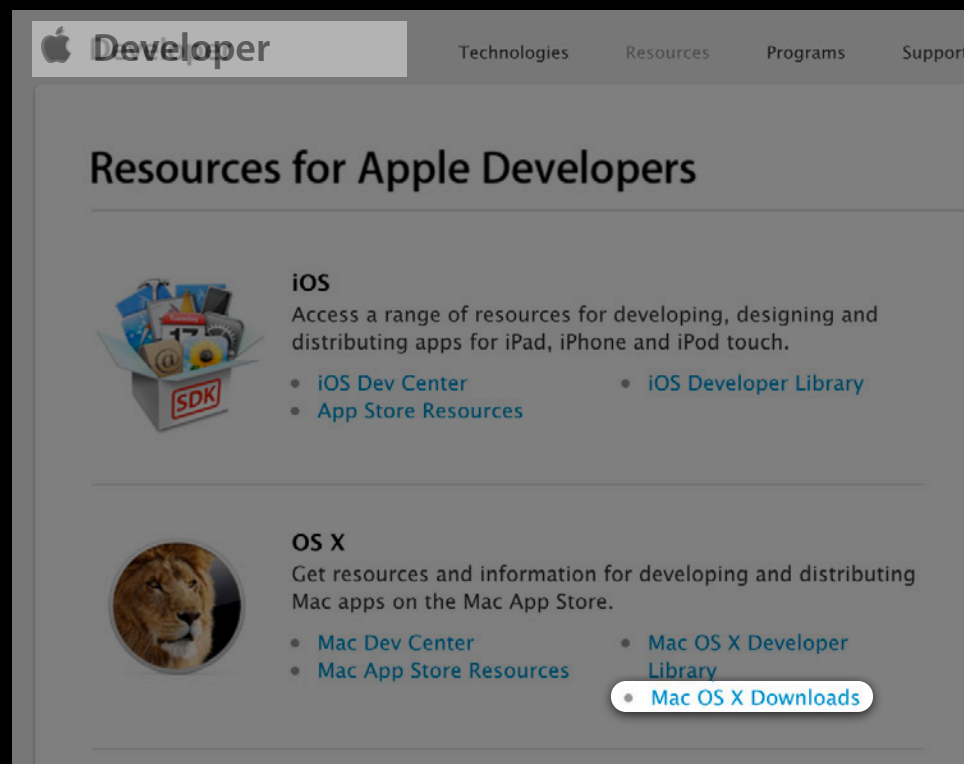
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 **OS X**
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Obtaining the Command Line Tools

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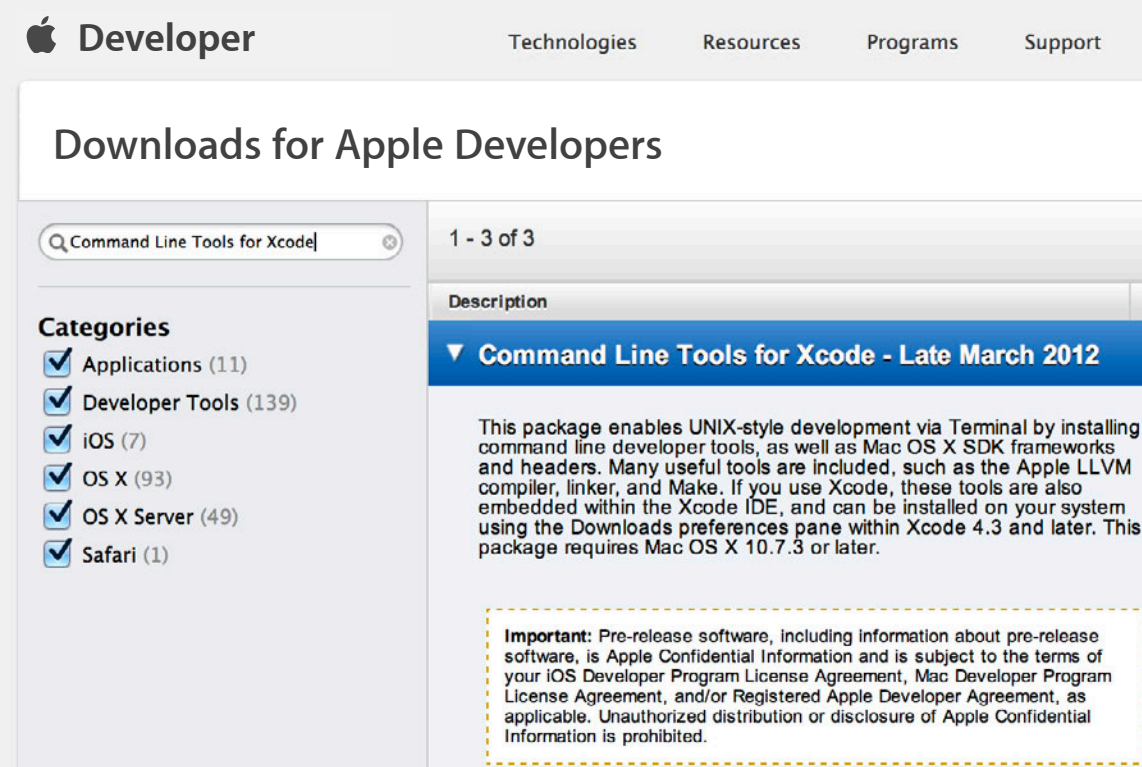
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The screenshot shows the Apple Developer website interface. At the top, there is a navigation bar with the Apple logo and the word "Developer", followed by links for "Technologies", "Resources", "Programs", and "Support". Below this is a main heading "Downloads for Apple Developers". A search bar contains the text "Command Line Tools for Xcode". To the left, a "Categories" sidebar lists several options with checkboxes: Applications (11), Developer Tools (139), iOS (7), OS X (93), OS X Server (49), and Safari (1). The main content area shows "1 - 3 of 3" results. The first result is "Command Line Tools for Xcode - Late March 2012", which is expanded to show a description: "This package enables UNIX-style development via Terminal by installing command line developer tools, as well as Mac OS X SDK frameworks and headers. Many useful tools are included, such as the Apple LLVM compiler, linker, and Make. If you use Xcode, these tools are also embedded within the Xcode IDE, and can be installed on your system using the Downloads preferences pane within Xcode 4.3 and later. This package requires Mac OS X 10.7.3 or later." Below the description is an "Important" notice in a dashed box: "Important: Pre-release software, including information about pre-release software, is Apple Confidential Information and is subject to the terms of your iOS Developer Program License Agreement, Mac Developer Program License Agreement, and/or Registered Apple Developer Agreement, as applicable. Unauthorized distribution or disclosure of Apple Confidential Information is prohibited."

Apple Developer Technologies Resources Programs Support

Downloads for Apple Developers

Q Command Line Tools for Xcode

1 - 3 of 3

Description	R
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Obtaining the Command Line Tools

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Apple Developer

Technologies Resources Programs Support

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Apple Developer

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Downloads for Apple Developers

Command Line Tools for Xcode

1 - 3 of 3

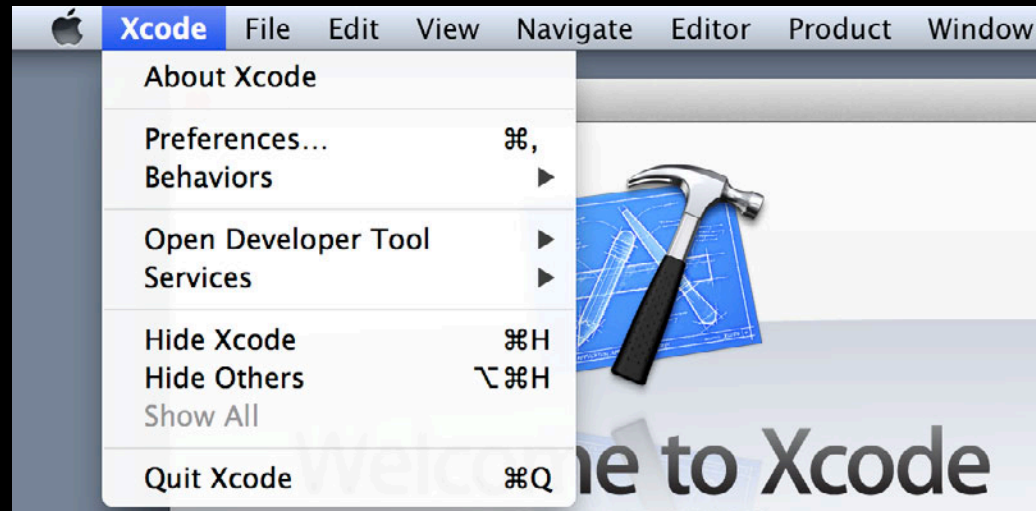
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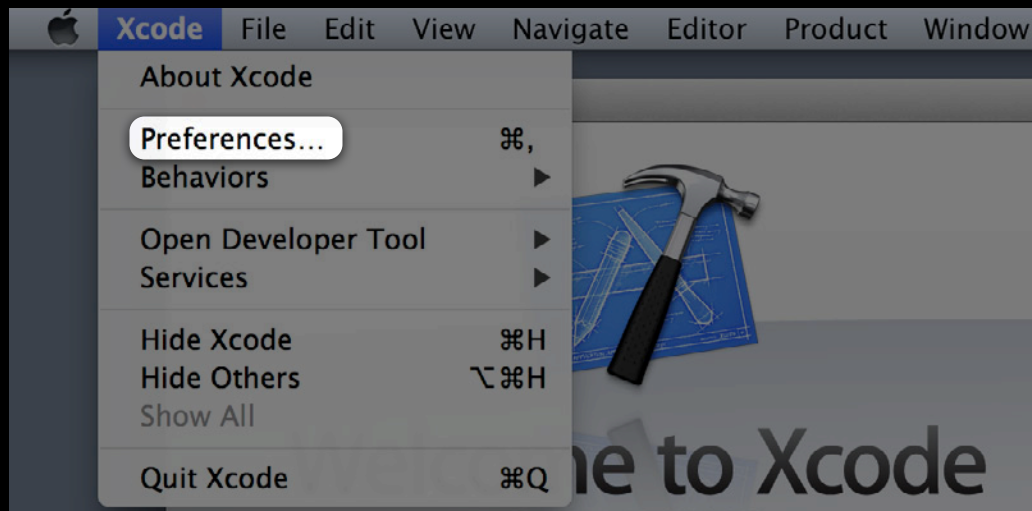
Obtaining the Command Line Tools

As part of Xcode



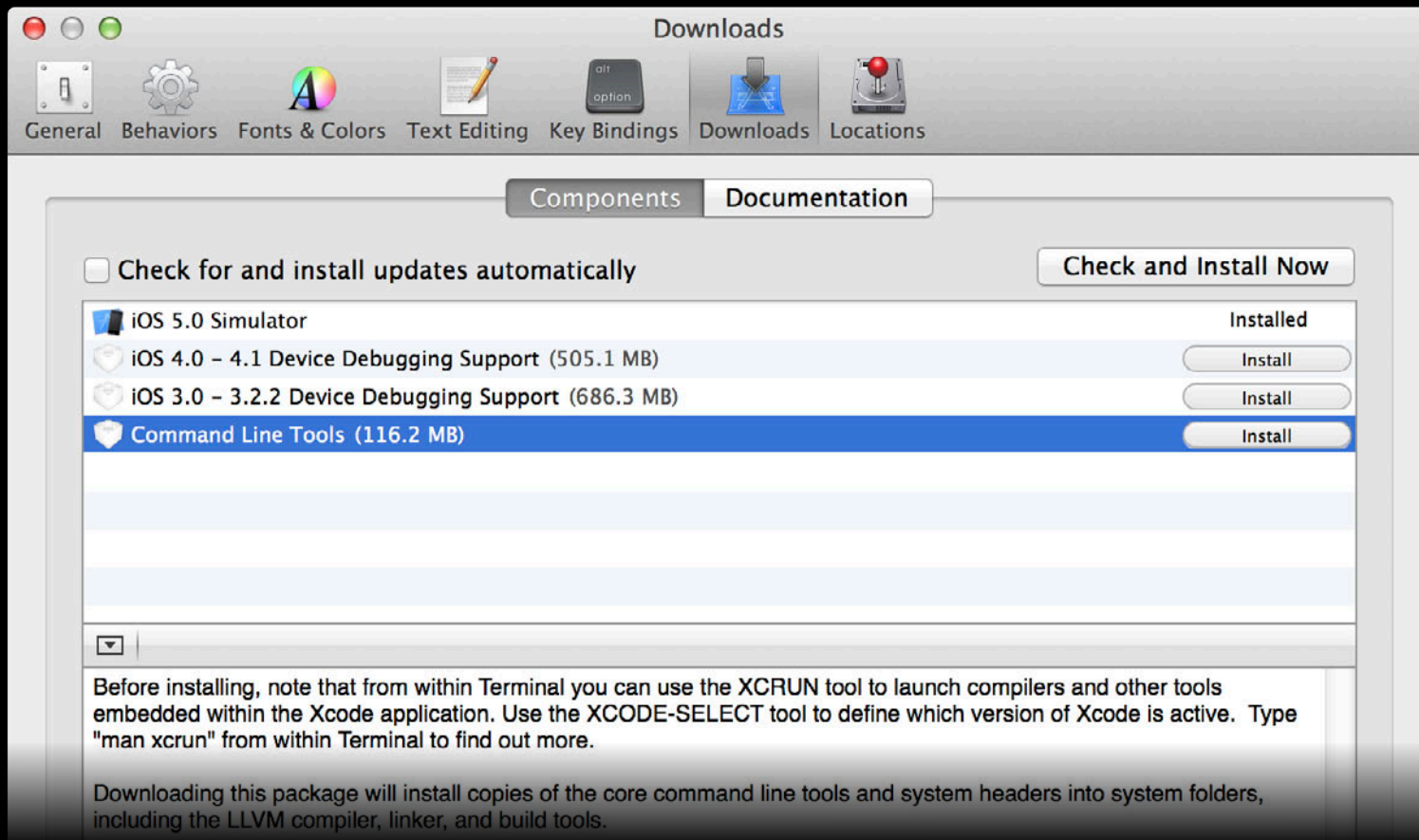
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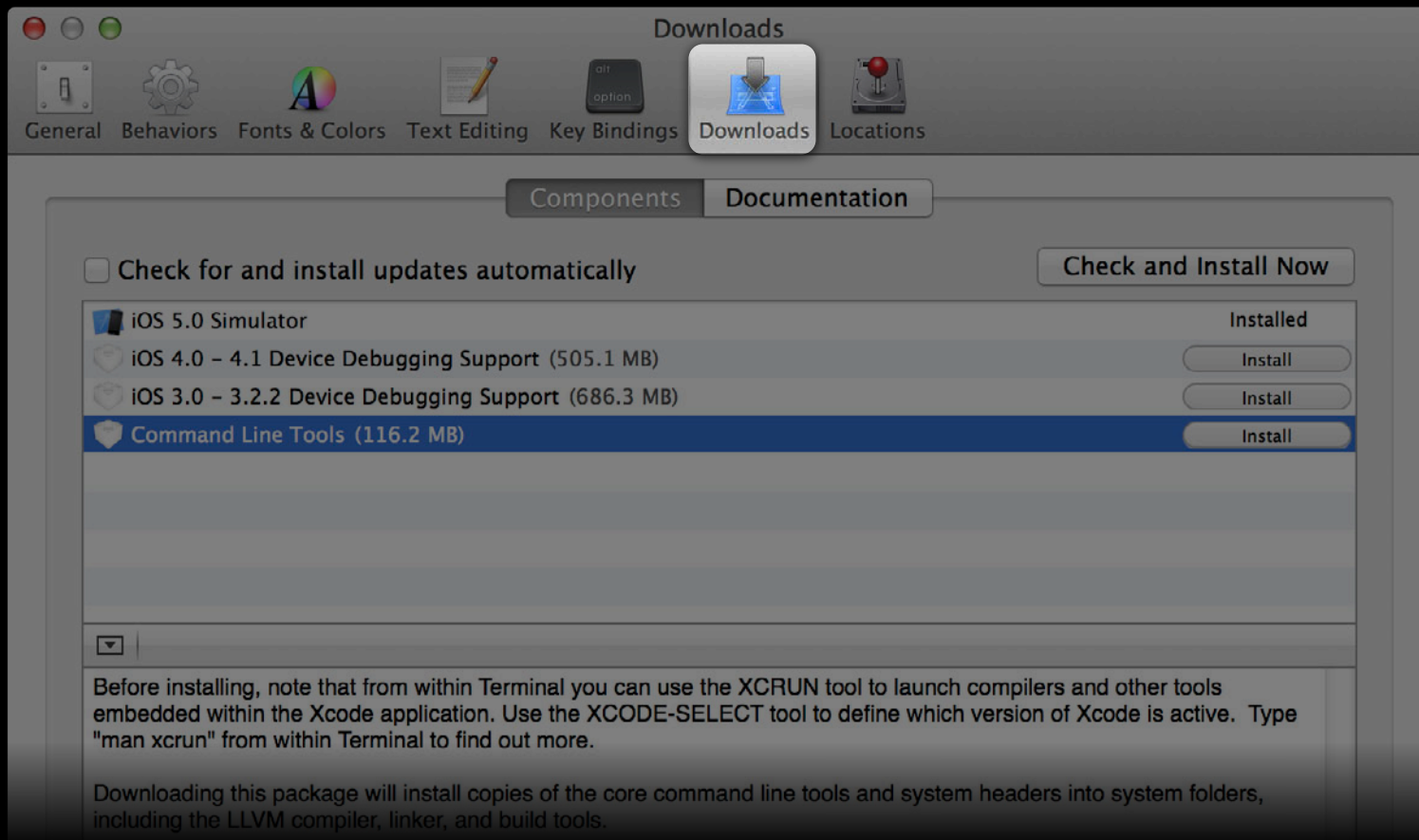
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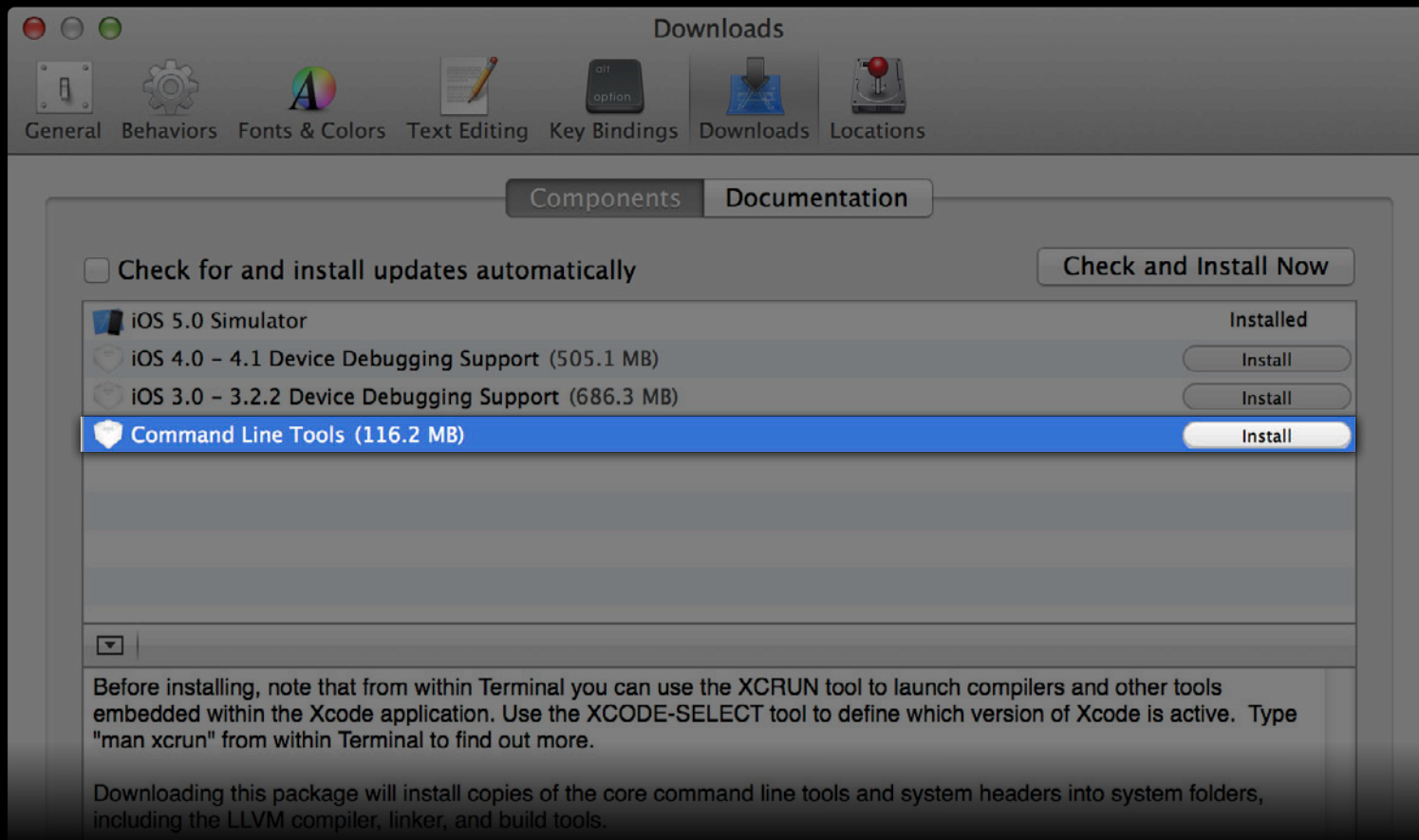
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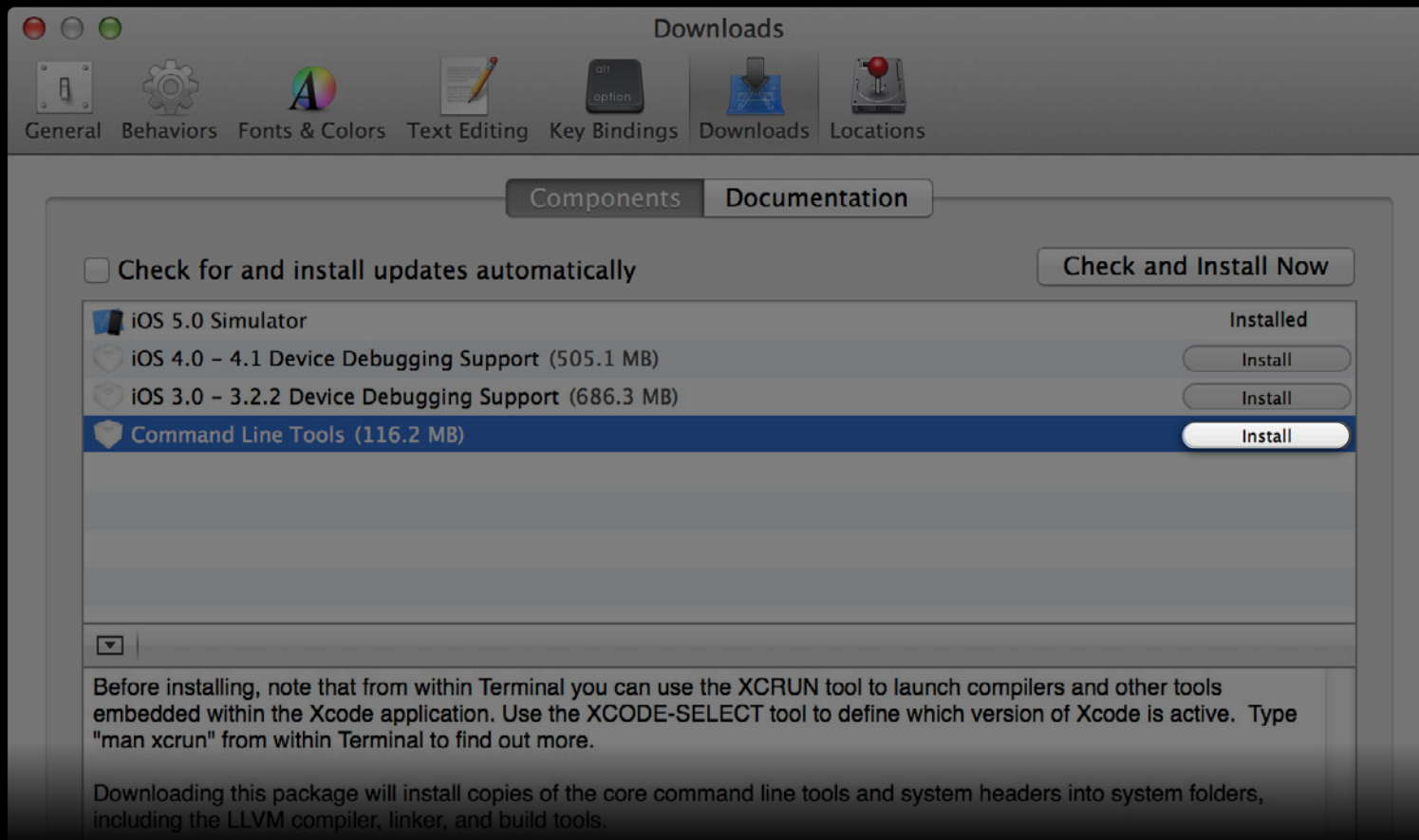
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When to Install the Package



- Open source development

When to Install the Package



- Open source development
 - Recommended practice for working with Fink, MacPorts, Homebrew

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Command Line Tools

When to Install the Package



- Extensive command line usage

When to Install the Package



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 - Traditional UNIX-style workflow

When to Install the Package



- Extensive command line usage
 - Traditional UNIX-style workflow
 - Legacy projects

When to Install the Package



- Extensive command line usage
 - Traditional UNIX-style workflow
 - Legacy projects
 - Non-Xcode IDE based development (e.g., Makefiles)

When to Install the Package



- Limited development, small download size

When to Install the Package



- Limited development, small download size
 - Command line tools package is self-contained

When to Install the Package



- Limited development, small download size
 - Command line tools package is self-contained
 - Does not contain Xcode IDE or other packages

When Not to Install the Package



When Not to Install the Package



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- Do not install unless you need them
 - Only one instance of command line tools
 - Install is distinct from Xcode
 - Requires manual effort to keep up-to-date with new releases

Review

Primary Xcode Command Line Tools

Tool	Summary
<code>xcode-select</code>	Choose the default Xcode.app to use
<code>xcodebuild</code>	Build, archive, and query Xcode projects and workspaces
<code>xcrun</code>	Find and execute command line tools that are inside Xcode
<code>man</code>	Access to command line documentation

Common `xcode-select` Options

Option

Usage

`-print-path`

Show the currently selected Xcode Developer directory

`-switch <path>`

Switch to the given Xcode (or Developer directory)

Common xcodebuild Options

Option	Usage
<code>-workspace <name></code> <code>-project <name></code>	Select a project or workspace to operate on
<code>-scheme <name></code>	Select a scheme to use
<code>-sdk <name></code>	Select an SDK to use
<code>-showsdk</code>	List available SDKs
<code>-list</code>	List schemes or targets for active project or workspace
<code>-showBuildSettings</code>	List active build settings and their values
<code>NAME=VALUE</code>	Override a build setting with a particular value

Common xcrun Options

Option

Usage

`-find <name>`

Find a tool in the active Xcode

`-sdk <name>`

Select an SDK to perform lookups in

`<tool> ... args ...`

Find and execute the tool with the provided arguments

More Information

Michael Jurewitz

Developer Tools Evangelist

jury@apple.com

Documentation

Xcode Build Setting Reference

<http://developer.apple.com>

man Pages

<http://developer.apple.com>

(or `man <toolname>` on the command line)

Apple Developer Forums

<http://devforums.apple.com>

Related Sessions

Working with Schemes and Projects in Xcode

Marina
Wednesday 4:30PM

Building, Archiving, and Submitting Your App

Pacific Heights
Thursday 4:30PM

Labs

Xcode Lab

Developer Tools Lab B
Daily 9:00AM

Xcode Lab

Developer Tools Lab B
Daily 2:00PM

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Summary

- Xcode provides a number of tools for working on the command
- Use `xcodebuild` to script and automate builds
 - Use build settings and schemes to customize to your project
- Consider using continuous integration to improve development
- Use the Command Line Tools package when working outside Xcode

 WWDC2012

