**http://www.monobjc.net/xcode-project-file-format.html**

**Introduction**

The Xcode project file is an old-style plist (Next style) based on braces to delimit the hierarchy. The file begins with an explicit encoding information, usually the UTF-8 one. This means that the file must not bear a BOM (Byte Ordering Mark) at its start or the parsing will fail.

Note: The following document is based on observations of various \*.pbxproj files and element properties have been inferred. There was not code reverse engineering involved what so ever.

**Unique Identification**

Each element in the file is uniquely identified by a 96 bits identifier using a 24 hexadecimal representation. This unique identifier is unique accross the document.

The algorithm used by Xcode to generate the unique identifier seems to be based both on date, sequence and pre-defined values, but as there is no evidence that these identifiers must follow a generation convention, one can think that arbitrary identifier can be used, as long as they are unique accross the document.

The following references were useful while writing this note:

A brief look at the Xcode project format [Cmake] Re: CMake Apple XCode support? PBTOMAKE -- Xcode to Unix

**Elements**

Here is the list of elements contained in the file format:

* Root Element
* PBXBuildFile
* PBXBuildPhase
  + PBXAppleScriptBuildPhase
  + PBXCopyFilesBuildPhase
  + PBXFrameworksBuildPhase
  + PBXHeadersBuildPhase
  + PBXResourcesBuildPhase
  + PBXShellScriptBuildPhase
  + PBXSourcesBuildPhase
* PBXContainerItemProxy
* PBXFileElement
  + PBXFileReference
  + PBXGroup
  + PBXVariantGroup
* PBXTarget
  + PBXAggregateTarget
  + PBXLegacyTarget
  + PBXNativeTarget
* PBXProject
* PBXTargetDependency
* XCBuildConfiguration
* XCConfigurationList

**Root Element**

The root section contains the general informations.

| **Attribute** | **Type** | **Value** | **Comment** |
| --- | --- | --- | --- |
| archiveVersion | Number | 1 | Default value. |
| classes | List | Empty |  |
| objectVersion | Number |  | See XcodeCompatibilityVersion enumeration. |
| objects | Map | A map of element | The map is indexed by the elements identifier. |
| rootObject | Reference | An element reference | The object is a reference to a PBXProject element. |

Example:

// !$\*UTF8\*$!

{

archiveVersion = 1;

classes = {

};

objectVersion = 45;

objects = {

...

};

rootObject = 0867D690FE84028FC02AAC07 /\* Project object \*/;

}

**PBXAggregateTarget**

This is the element for a build target that aggregates several others.

| **Attribute** | **Type** | **Value** | **Comment** |
| --- | --- | --- | --- |
| reference | UUID | A 96 bits identifier |  |
| isa | PBXAggregateTarget | Empty |  |
| buildConfigurationList | Reference | An element reference | The object is a reference to a XCConfigurationList element. |
| buildPhases | List | A list of element reference | The objects are a reference to a PBXBuildPhase element. |
| dependencies | List | A list of element reference | The objects are a reference to a PBXTargetDependency element. |
| name | String | The name of the target. |  |
| productName | String | The product name. |  |

Example:

4DA521A6115A00AF007C19C3 /\* documentation \*/ = {

isa = PBXAggregateTarget;

buildConfigurationList = 4DA521AE115A00ED007C19C3 /\* Build configuration list for PBXAggregateTarget "documentation" \*/;

buildPhases = (

4DA521A5115A00AF007C19C3 /\* ShellScript \*/,

);

dependencies = (

4DA521AA115A00BC007C19C3 /\* PBXTargetDependency \*/,

);

name = documentation;

productName = documentation;

};

**PBXBuildFile**

This element indicate a file reference that is used in a PBXBuildPhase (either as an include or resource).

| **Attribute** | **Type** | **Value** | **Comment** |
| --- | --- | --- | --- |
| reference | UUID | A 96 bits identifier |  |
| isa | PBXBuildFile | Empty |  |
| fileRef | Reference | An element reference | The object is a reference to a PBXFileReference element. |
| settings | Map |  | A map of key/value pairs for additionnal settings. |

Example:

4D05CA6B1193055000125045 /\* xxx.c in Sources \*/ = {

isa = PBXBuildFile;

fileRef = 4D05CA411193055000125045 /\* xxx.c \*/;

};

**PBXBuildPhase**

This element is an abstract parent for specialized build phases.

**PBXContainerItemProxy**

This is the element for to decorate a target item.

| **Attribute** | **Type** | **Value** | **Comment** |
| --- | --- | --- | --- |
| reference | UUID | A 96 bits identifier |  |
| isa | PBXContainerItemProxy | Empty |  |
| containerPortal | Reference | An element reference | The object is a reference to a PBXProject element. |
| proxyType | Number | 1 |  |
| remoteGlobalIDString | Reference | An element reference | A unique reference ID. |
| remoteInfo | String |  |  |

Example:

4D22DC0C1167C992007AF714 /\* PBXContainerItemProxy \*/ = {

isa = PBXContainerItemProxy;

containerPortal = 08FB7793FE84155DC02AAC07 /\* Project object \*/;

proxyType = 1;

remoteGlobalIDString = 87293EBF1153C114007AFD45;

remoteInfo = xxx;

};

**PBXCopyFilesBuildPhase**

This is the element for the copy file build phase.

| **Attribute** | **Type** | **Value** | **Comment** |
| --- | --- | --- | --- |
| reference | UUID | A 96 bits identifier |  |
| isa | PBXCopyFilesBuildPhase | Empty |  |
| buildActionMask | Number | 2^32-1 |  |
| dstPath | String | The destination path |  |
| dstSubfolderSpec | Number |  |  |
| files | List | A list of element reference | The objects are a reference to a PBXBuildFile element. |
| runOnlyForDeploymentPostprocessing | Number | 0 |  |

Example:

MISSING

**PBXFileElement**

This element is an abstract parent for file and group elements.

**PBXFileReference**

A PBXFileReference is used to track every external file referenced by the project: source files, resource files, libraries, generated application files, and so on.

| **Attribute** | **Type** | **Value** | **Comment** |
| --- | --- | --- | --- |
| reference | UUID | A 96 bits identifier |  |
| isa | PBXFileReference | Empty |  |
| fileEncoding | Number |  | See the PBXFileEncoding enumeration. |
| explicitFileType | String |  | See the PBXFileType enumeration. |
| lastKnownFileType | String |  | See the PBXFileType enumeration. |
| name | String | The filename. |  |
| path | String | The path to the filename. |  |
| sourceTree | String | See the PBXSourceTree enumeration. |  |

Example:

87293F901153D870007AFD45 /\* monobjc.mm \*/ = {

isa = PBXFileReference;

fileEncoding = 4;

lastKnownFileType = sourcecode.cpp.objcpp;

name = monobjc.mm;

path = sources/monobjc.mm;

sourceTree = "";

};

**PBXFrameworksBuildPhase**

This is the element for the framewrok link build phase.

| **Attribute** | **Type** | **Value** | **Comment** |
| --- | --- | --- | --- |
| reference | UUID | A 96 bits identifier |  |
| isa | PBXFrameworksBuildPhase | Empty |  |
| buildActionMask | Number | 2^32-1 |  |
| files | List | A list of element reference | The objects are a reference to a PBXBuildFile element. |
| runOnlyForDeploymentPostprocessing | Number | 0 |  |

Example:

4D05CA2C119304BD00125045 /\* Frameworks \*/ = {

isa = PBXFrameworksBuildPhase;

buildActionMask = 2147483647;

files = (

);

runOnlyForDeploymentPostprocessing = 0;

};

**PBXGroup**

This is the element to group files or groups.

| **Attribute** | **Type** | **Value** | **Comment** |
| --- | --- | --- | --- |
| reference | UUID | A 96 bits identifier |  |
| isa | PBXGroup | Empty |  |
| children | List | A list of element reference | The objects are a reference to a PBXFileElement element. |
| name | String | The filename. |  |
| sourceTree | String | See the PBXSourceTree enumeration. |  |

Example:

4DA521A2115A003E007C19C3 /\* scripts \*/ = {

isa = PBXGroup;

children = (

4D22DBAF116742DE007AF714 /\* fix\_references.sh \*/,

4DA521A1115A0032007C19C3 /\* generate\_descriptors.sh \*/,

);

name = scripts;

sourceTree = "";

};

**PBXHeadersBuildPhase**

This is the element for the framewrok link build phase.

| **Attribute** | **Type** | **Value** | **Comment** |
| --- | --- | --- | --- |
| reference | UUID | A 96 bits identifier |  |
| isa | PBXHeadersBuildPhase | Empty |  |
| buildActionMask | Number | 2^32-1 |  |
| files | List | A list of element reference | The objects are a reference to a PBXBuildFile element. |
| runOnlyForDeploymentPostprocessing | Number | 0 |  |

Example:

87293EBC1153C114007AFD45 /\* Headers \*/ = {

isa = PBXHeadersBuildPhase;

buildActionMask = 2147483647;

files = (

);

runOnlyForDeploymentPostprocessing = 0;

};

**PBXLegacyTarget**

MISSING

**PBXNativeTarget**

This is the element for a build target that produces a binary content (application or library).

| **Attribute** | **Type** | **Value** | **Comment** |
| --- | --- | --- | --- |
| reference | UUID | A 96 bits identifier |  |
| isa | PBXNativeTarget | Empty |  |
| buildConfigurationList | Reference | An element reference | The object is a reference to a XCConfigurationList element. |
| buildPhases | List | A list of element reference | The objects are a reference to a PBXBuildPhase element. |
| dependencies | List | A list of element reference | The objects are a reference to a PBXTargetDependency element. |
| name | String | The name of the target. |  |
| productInstallPath | String | The product install path. |  |
| productName | String | The product name. |  |
| productReference | Reference | An element reference | The object is a reference to a PBXFileReference element. |
| productType | String |  | See the PBXProductType enumeration. |

Example:

8D1107260486CEB800E47090 /\* XXX \*/ = {

isa = PBXNativeTarget;

buildConfigurationList = C01FCF4A08A954540054247B /\* Build configuration list for PBXNativeTarget "XXX" \*/;

buildPhases = (

8D1107290486CEB800E47090 /\* Resources \*/,

8D11072C0486CEB800E47090 /\* Sources \*/,

8D11072E0486CEB800E47090 /\* Frameworks \*/,

);

buildRules = (

);

dependencies = (

);

name = XXX;

productInstallPath = "$(HOME)/Applications";

productName = TrackIt;

productReference = 8D1107320486CEB800E47090 /\* XXX.app \*/;

productType = "com.apple.product-type.application";

};

**PBXProject**

This is the element for a build target that produces a binary content (application or library).

| **Attribute** | **Type** | **Value** | **Comment** |
| --- | --- | --- | --- |
| reference | UUID | A 96 bits identifier |  |
| isa | PBXProject | Empty |  |
| buildConfigurationList | Reference | An element reference | The object is a reference to a XCConfigurationList element. |
| compatibilityVersion | String | A string representation of the XcodeCompatibilityVersion. |  |
| developmentRegion | String |  | The region of development. |
| hasScannedForEncodings | Number | 0 or 1 | Whether file encodings have been scanned. |
| knownRegions | List | A list of string | The known regions for localized files. |
| mainGroup | Reference | An element reference | The object is a reference to a PBXGroup element. |
| productRefGroup | Reference | An element reference | The object is a reference to a PBXGroup element. |
| projectDirPath | String | The relative path of the project. |  |
| projectReferences | Array of map | Each map in the array contains two keys: ProductGroup and ProjectRef. |  |
| projectRoot | String | The relative root path of the project. |  |
| targets | List | A list of element reference | The objects are a reference to a PBXTarget element. |

Example:

29B97313FDCFA39411CA2CEA /\* Project object \*/ = {

isa = PBXProject;

buildConfigurationList = C01FCF4E08A954540054247B /\* Build configuration list for PBXProject "XXX" \*/;

compatibilityVersion = "Xcode 2.4";

developmentRegion = English;

hasScannedForEncodings = 1;

knownRegions = (

English,

Japanese,

French,

German,

en,

);

mainGroup = 29B97314FDCFA39411CA2CEA /\* XXX\*/;

projectDirPath = "";

projectRoot = "";

targets = (

8D1107260486CEB800E47090 /\* XXX\*/,

);

};

**PBXResourcesBuildPhase**

This is the element for the resources copy build phase.

| **Attribute** | **Type** | **Value** | **Comment** |
| --- | --- | --- | --- |
| reference | UUID | A 96 bits identifier |  |
| isa | PBXResourcesBuildPhase | Empty |  |
| buildActionMask | Number | 2^32-1 |  |
| files | List | A list of element reference | The objects are a reference to a PBXBuildFile element. |
| runOnlyForDeploymentPostprocessing | Number | 0 |  |

Example:

8D1107290486CEB800E47090 /\* Resources \*/ = {

isa = PBXResourcesBuildPhase;

buildActionMask = 2147483647;

files = (

535C1E1B10AB6B6300F50231 /\* ReadMe.txt in Resources \*/,

533B968312721D05005E617D /\* Credits.rtf in Resources \*/,

533B968412721D05005E617D /\* InfoPlist.strings in Resources \*/,

533B968512721D05005E617D /\* MainMenu.nib in Resources \*/,

533B968612721D05005E617D /\* TableEdit.nib in Resources \*/,

533B968712721D05005E617D /\* TestWindow.nib in Resources \*/,

);

runOnlyForDeploymentPostprocessing = 0;

};

**PBXShellScriptBuildPhase**

This is the element for the resources copy build phase.

| **Attribute** | **Type** | **Value** | **Comment** |
| --- | --- | --- | --- |
| reference | UUID | A 96 bits identifier |  |
| isa | PBXShellScriptBuildPhase | Empty |  |
| buildActionMask | Number | 2^32-1 |  |
| files | List | A list of element reference | The objects are a reference to a PBXBuildFile element. |
| inputPaths | List | A list of string | The input paths. |
| outputPaths | List | A list of string | The output paths. |
| runOnlyForDeploymentPostprocessing | Number | 0 |  |
| shellPath | String | The path to the shell interpreter. |  |
| shellScript | String | The content of the script shell. |  |

Example:

4D22DBAE11674009007AF714 /\* ShellScript \*/ = {

isa = PBXShellScriptBuildPhase;

buildActionMask = 2147483647;

files = (

);

inputPaths = (

);

outputPaths = (

);

runOnlyForDeploymentPostprocessing = 0;

shellPath = /bin/sh;

shellScript = "./fix\_references.sh";

};

**PBXSourcesBuildPhase**

This is the element for the sources compilation build phase.

| **Attribute** | **Type** | **Value** | **Comment** |
| --- | --- | --- | --- |
| reference | UUID | A 96 bits identifier |  |
| isa | PBXSourcesBuildPhase | Empty |  |
| buildActionMask | Number | 2^32-1 |  |
| files | List | A list of element reference | The objects are a reference to a PBXBuildFile element. |
| runOnlyForDeploymentPostprocessing | Number | 0 |  |

Example:

4DF8B22D1171CFBF0081C1DD /\* Sources \*/ = {

isa = PBXSourcesBuildPhase;

buildActionMask = 2147483647;

files = (

4DF8B23E1171D0310081C1DD /\* test.mm in Sources \*/,

);

runOnlyForDeploymentPostprocessing = 0;

};

**PBXTarget**

This element is an abstract parent for specialized targets.

**PBXTargetDependency**

This is the element for referencing other target through content proxies.

| **Attribute** | **Type** | **Value** | **Comment** |
| --- | --- | --- | --- |
| reference | UUID | A 96 bits identifier |  |
| isa | PBXTargetDependency | Empty |  |
| target | Reference | An element reference | The object is a reference to a PBXNativeTarget element. |
| targetProxy | Reference | An element reference | The object is a reference to a PBXContainerItemProxy element. |

Example:

4D22DC0D1167C992007AF714 /\* PBXTargetDependency \*/ = {

isa = PBXTargetDependency;

target = 87293EBF1153C114007AFD45 /\* libXXX \*/;

targetProxy = 4D22DC0C1167C992007AF714 /\* PBXContainerItemProxy \*/;

};

**PBXVariantGroup**

This is the element for referencing localized resources.

| **Attribute** | **Type** | **Value** | **Comment** |
| --- | --- | --- | --- |
| reference | UUID | A 96 bits identifier |  |
| isa | PBXVariantGroup | Empty |  |
| children | List | A list of element reference | The objects are a reference to a PBXFileElement element. |
| name | String | The filename. |  |
| sourceTree | String | See the PBXSourceTree enumeration. |  |

Example:

870C88031338A77600A69309 /\* MainMenu.xib \*/ = {

isa = PBXVariantGroup;

children = (

870C88041338A77600A69309 /\* en \*/,

);

name = MainMenu.xib;

sourceTree = "";

};

**XCBuildConfiguration**

This is the element for defining build configuration.

| **Attribute** | **Type** | **Value** | **Comment** |
| --- | --- | --- | --- |
| reference | UUID | A 96 bits identifier |  |
| isa | XCBuildConfiguration | Empty |  |
| baseConfigurationReference | String | The path to a xcconfig file |  |
| buildSettings | Map | A map of build settings. |  |
| name | String | The configuration name. |  |

Example:

870C88151338ABB600A69309 /\* Debug \*/ = {

isa = XCBuildConfiguration;

buildSettings = {

PRODUCT\_NAME = "$(TARGET\_NAME)";

};

name = Debug;

};

870C88161338ABB600A69309 /\* Release \*/ = {

isa = XCBuildConfiguration;

buildSettings = {

PRODUCT\_NAME = "$(TARGET\_NAME)";

};

name = Release;

};

**XCConfigurationList**

This is the element for listing build configurations.

| **Attribute** | **Type** | **Value** | **Comment** |
| --- | --- | --- | --- |
| reference | UUID | A 96 bits identifier |  |
| isa | XCConfigurationList | Empty |  |
| buildConfigurations | List | A list of element reference | The objects are a reference to a XCBuildConfiguration element. |
| defaultConfigurationIsVisible | Number | 0 |  |
| defaultConfigurationName | String | The default configuration name. |  |

Example:

870C87E41338A77600A69309 /\* Build configuration list for PBXProject "CocoaApp" \*/ = {

isa = XCConfigurationList;

buildConfigurations = (

870C88061338A77600A69309 /\* Debug \*/,

870C88071338A77600A69309 /\* Release \*/,

);

defaultConfigurationIsVisible = 0;

defaultConfigurationName = Release;

};

Copyright © 2008-2014 Laurent Etiemble. All rights reserved. Logo licenced from iStockPhoto.