

# LaunchTime:

启动有冷启动与热启动，此处只针对冷启动。因为热启动时候应用已经在内存中处于就绪状态，随时可运行，不做讨论。

## Part1. Pre-main

所有发生在`main()`之前的过程

文件加载相关：‘ref-001’

加载解析所有可执行文件，自身App的所有.o文件集合(所有类文件会被编译为.o)，动态链接库执行加载，运行所有的初始化方法。

### 核心方向

#### Do less!

- Embed fewer dylibs
- Declare fewer classes/methods
- Use fewer initializers

#### Use more Swift

- No initializers
- Swift size improvements

#### Static initializer tracing 【Instruments -> device -> application】

New in iOS 11 and macOS High Sierra

Provides precise timing for each static initializer

Available through Instruments

- Initializer Calls
- CPU Usage(Time Profiler)

### 优化点:

#### 1. Dylib Loading

#### 2. Rebase/Binding

#### 3. ObjC Setup

#### 4. Initializers

## 5. Measure launch times with DYLD\_PRINT\_STATISTICS

- Embedding fewer dylibs
- Consolidating Objective-C classes
- Eliminating static initializers

### TODO:

- 遍历工程，（工具及人工查漏）清除所有冗余文件(类、图片)，库。
- 使用 `+initialize` 来替代 `+load`
- `load` VS `initialize`

可以删除类、图片资源 文件

### 1. `fui tool check project and delete rubbish files`:

bogon:ysdq lxw\$ fui find	是否可移除	补充
Le123PhoneClient/Component/DQPortraitViewController/UITabBar+LargeHeight.h		
Le123PhoneClient/Component/DQSceneryView.h	1	
Le123PhoneClient/Component/Player/DQPlayer/Deprecated/DQVideoStreamInfo.h	1	
Le123PhoneClient/Component/Player/DQPlayer/Player/PlayerTimerMachine/PlayerTimerScreenShutView.h		
Le123PhoneClient/Component/Player/DQPlayer/Players/ThirdPartPlayers/DQPptvPlayerView.h		
Le123PhoneClient/Component/Player/DQPlayer/UI/DQPlayerBottomView.h	1	
Le123PhoneClient/Component/Player/ReportCDE/DQReportCdeRequest.h	1	cde 上报
Le123PhoneClient/Extension/UILabel+CustomAttributesLabel.h	1	
Le123PhoneClient/Modules/About/Interface/AboutModule.h	1	
Le123PhoneClient/Modules/Channel/View/DQTabBar.h	1	
Le123PhoneClient/Modules/ComplainsReport/Interface/ComplainsReportModule.h	1	
Le123PhoneClient/Modules/DebugSettings/View/DebugSettingsAddNewCell.h		
Le123PhoneClient/Modules/Detail/AirServer/DQAirServerDrawer.h		
Le123PhoneClient/Modules/Discover/Interface/DiscoverModule.h		
Le123PhoneClient/Modules/Download/Present/DownloadPresent.h	1	
Le123PhoneClient/Modules/Favorite&History/Common/Business/CommonBusiness.h	1	
Le123PhoneClient/Modules/Favorite&History/Favorite/Interface/FavoriteModule.h		
Le123PhoneClient/Modules/Favorite&History/History/Interface/HistoryModule.h		
Le123PhoneClient/Modules/Live/APIs/DQLiveListRequest.h	1	直播模块整个移除
Le123PhoneClient/Modules/Live/Interface/LiveModule.h	1	直播模块整个移除
Le123PhoneClient/Modules/Live/View/DQLiveItemCell.h	1	直播模块整个移除
Le123PhoneClient/Modules/LogReporter/Interface/LogReporterModule.h	1	logReport模块整个移除
Le123PhoneClient/Modules/Rank/ViewController/DQMainRankViewController.h	1	
Le123PhoneClient/Modules/Rank/ViewController/DQRank50ViewController.h	1	
Le123PhoneClient/Modules/Rank/ViewController/DQRankCategoryViewController.h	1	
Le123PhoneClient/Modules/Rank/ViewController/DQRankViewController.h	1	
Le123PhoneClient/Modules/Recommend/Interface/HomeModule.h		
Le123PhoneClient/Modules/Register/Interface/LoginModule.h		
Le123PhoneClient/Modules/Register/Interface/RegisterModule.h		
Le123PhoneClient/Modules/Register/Interface/SetPwdModule.h		
Le123PhoneClient/Modules/Register/Present/RegisterPresent.h	1	
Le123PhoneClient/Modules/Search/View/SearchEmptyView/SearchEmptyView.h	1	
Le123PhoneClient/Modules/Settings/Interface/SettingsModule.h		
Le123PhoneClient/Modules/Topic/View/TopicDetailMultiItemCollectionCell.h		
Le123PhoneClient/Modules/Topic/View/TopicDetailSectionHeaderView.h		
Le123PhoneClient/Modules/UserCenter/Interface/UserCenterModule.h		
Le123PhoneClient/Modules/UserCenter/View/DQUserCenterLoginTableViewCell.h		
Le123PhoneClient/Modules/UserCenter/View/DQUserCenterLogoutTableViewCell.h		
Le123PhoneClient/Modules/UserInfo/Interface/UserInfoModule.h		
Le123PhoneClient/Modules/VideoFeedBack/ViewController/UIAlertController+Rotation.h	1	
Le123PhoneClient/Modules/WebViewPlayer/Interface/WebViewPlayerModule.h		可调整代码
Le123PhoneClient/Modules/Webview/Interface/WebviewModule.h		
Le123PhoneClient/Ninty/Extension/NSData+NTYExtension.h		
Le123PhoneClient/Ninty/Extension/NSObject+NTYAvoidCrash.h		
Le123PhoneClient/Ninty/Extension/NSObject+Safe_UndefinedKey.h		
Le123PhoneClient/Ninty/Extension/NSString+UnsignedLongLongValue.h		
Le123PhoneClient/Ninty/Extension/UIImagePickerController+OrientationsSupport.h		
Le123PhoneClient/Ninty/Extension/UINib+NTYExtension.h		
Le123PhoneClient/Ninty/MemoryDetector/NTYPerformanceProfile.h		
Le123PhoneClient/Ninty/MemoryDetector/UIAlertController+NTY_MemoryLeakDetect.h		
Le123PhoneClient/Ninty/MemoryDetector/UIViewController+NTYMemoryLeakDetector.h		
Le123PhoneClient/Ninty/NTYWebImage/SDWebImageX/SDWebImageDownloaderOperationX.h		
Le123PhoneClient/SARRS/Proxy/SupportCollectionViewModel.h	1	
Le123PhoneClient/SARRS/Proxy/SupportViewModel.h	1	
Le123PhoneClient/Service/DLNA/Manager/BZXDLNADeviceManager.h		
Le123PhoneClient/Service/DQReportEngine/DQJSPatchManager.h	1	

## 2. iOS项目冗余资源扫描脚本：

##### several cases that the scripts does not work:

##### 1) there is space or slash in the resources file, such as "aaa .png"  
资源文件名中含有空格或者/

##### 2) reference resources in commented code 资源引用代码被注释了

##### 3) you need to manually checked the resources one by one in the result  
对于脚本检查结果，最好人工检查一遍

##### 4) you can add some other types more than png, jpg, gif, wav, m4a 如果  
需要检查其他资源，请自行修改脚本；

##### 5)默认文件后缀都是如@2x.png格式, 如果后缀格式不同, 请自行修改脚本;

##### set parameters: PrjPath为项目工程所在目录, 包含.m .xib文件; ResPath为被扫描的资源文件目录, 包含.png .wav

##### xcodeprojPath为工程xcodeproj位置

PrjPath=/Users/lxw/Desktop/ntc/repositories/ysdq/Le123PhoneClient

ResPath=/Users/lxw/Desktop/ntc/repositories/ysdq/Le123PhoneClient

xcodeprojPath=/Users/lxw/Desktop/ntc/repositories/ysdq/Le123PhoneClient.xcodeproj

if [ -f ~/Desktop/resource\_san\_result.txt ];then

rm -f ~/Desktop/resource\_san\_result.txt

fi

cd \$PrjPath

files=\$(find . -name "\*.m" -o -name "\*.xib" -o -name "\*.mm" -o -name "\*.plist")

cd \$ResPath

for png in \$(find . -name "\*.png" -o -name "\*.jpg" -o -name "\*.gif" -o -name "\*.wav" -o -name "\*.m4a")

do

basename='basename/'\$png

basename=\${basename##\*/}

# echo \$basename

if [ "\${basename##\*.}" == "png" ];then

echo \$basename|grep -q @2x.png

if [ \$? -eq 0 ];then

name=\${basename%%@2x.png}

else

echo \$basename|grep -q @3x.png

if [ \$? -eq 0 ];then

name=\${basename%%@3x.png}

else

name=\${basename%.png}

fi

fi

elif [ "\${basename##\*.}" == "jpg" ];then

echo \$basename|grep -q @2x.jpg

if [ \$? -eq 0 ];then

name=\${basename%%@2x.jpg}

else

echo \$basename|grep -q @3x.jpg

```

if [ $? -eq 0 ];then
name=${basename%%@3x.jpg}
else
name=${basename%%.jpg}
fi
fi

elif [ "${basename##*.}" == "gif" ];then
echo $basename|grep -q @2x.gif
if [ $? -eq 0 ];then
name=${basename%%@2x.gif}
else
echo $basename|grep -q @3x.gif
if [ $? -eq 0 ];then
name=${basename%%@3x.gif}
else
name=${basename%%.gif}
fi
fi

elif [ "${basename##*.}" == "wav" ];then
name=${basename%%.wav}

elif [ "${basename##*.}" == "m4a" ]; then
name=${basename%%.m4a}

else
name=''
fi

if [ ${#name} -gt 0 ];then
# # name=${name%[0-9]*}

cd $PrjPath
if grep -q $name $files;then
echo "$png" is used

else
cd $xcodeprojPath
if grep -q $name project.pbxproj;then
echo "$png" is not used >> ~/Desktop/resource_san_result.txt
else
echo "$png" is not packaged
fi
fi
else
echo name is empty

```

```

fi

done

if [ -f ~/Desktop/resource_san_result.txt ]; then
echo *****the end of scan. Please see result from resource_san_res
ult.txt
else
echo *****the end of scan, everything is OK
fi

```

扫描结果输出很多，局部截图如下，可以根据结果进行确认，并将确认的无用资源文件从工程中进行删除：

```

/Resource/CommonUI.xcassets/loading/白色转动13.imageset/转动13-1.png is not packaged
/Resource/CommonUI.xcassets/loading/白色转动14.imageset/转动14.png is not packaged
/Resource/CommonUI.xcassets/loading/白色转动14.imageset/转动14-1.png is not packaged
/Resource/CommonUI.xcassets/loading/白色转动14.imageset/转动14-2.png is not packaged
/Resource/CommonUI.xcassets/loading/白色转动1.imageset/转动1-1.png is not packaged
/Resource/CommonUI.xcassets/loading/白色转动1.imageset/转动1-2.png is not packaged
/Resource/CommonUI.xcassets/loading/白色转动1.imageset/转动1.png is not packaged
/Resource/CommonUI.xcassets/loading/白色转动11.imageset/转动11.png is not packaged
/Resource/CommonUI.xcassets/loading/白色转动11.imageset/转动11-1.png is not packaged
/Resource/CommonUI.xcassets/loading/白色转动11.imageset/转动11-2.png is not packaged
/Resource/CommonUI.xcassets/loading/白色转动10.imageset/转动10.png is not packaged
/Resource/CommonUI.xcassets/loading/白色转动10.imageset/转动10-2.png is not packaged
/Resource/CommonUI.xcassets/loading/白色转动10.imageset/转动10-1.png is not packaged
/Resource/CommonUI.xcassets/loading/白色转动5.imageset/转动5-2.png is not packaged
/Resource/CommonUI.xcassets/loading/白色转动5.imageset/转动5-1.png is not packaged
/Resource/CommonUI.xcassets/loading/白色转动5.imageset/转动5.png is not packaged
/Resource/CommonUI.xcassets/loading/白色转动4.imageset/转动4-1.png is not packaged
/Resource/CommonUI.xcassets/loading/白色转动4.imageset/转动4-2.png is not packaged
/Resource/CommonUI.xcassets/loading/白色转动4.imageset/转动4.png is not packaged
/Resource/CommonUI.xcassets/loading/白色转动8.imageset/转动8.png is not packaged
/Resource/CommonUI.xcassets/loading/白色转动8.imageset/转动8-2.png is not packaged
/Resource/CommonUI.xcassets/loading/白色转动8.imageset/转动8-1.png is not packaged
/Resource/CommonUI.xcassets/loading/白色转动9.imageset/转动9.png is not packaged
/Resource/CommonUI.xcassets/loading/白色转动9.imageset/转动9-1.png is not packaged
/Resource/CommonUI.xcassets/loading/白色转动9.imageset/转动9-2.png is not packaged
/Resource/CommonUI.xcassets/loading/白色转动2.imageset/转动2.png is not packaged
/Resource/CommonUI.xcassets/loading/白色转动2.imageset/转动2-1.png is not packaged
/Resource/CommonUI.xcassets/loading/白色转动2.imageset/转动2-2.png is not packaged
/Resource/CommonUI.xcassets/loading/白色转动3.imageset/转动3-2.png is not packaged
/Resource/CommonUI.xcassets/loading/白色转动3.imageset/转动3-1.png is not packaged
/Resource/CommonUI.xcassets/loading/白色转动3.imageset/转动3.png is not packaged
/Resource/CommonUI.xcassets/loading/白色转动16.imageset/转动16.png is not packaged
/Resource/CommonUI.xcassets/loading/白色转动16.imageset/转动16-2.png is not packaged
/Resource/CommonUI.xcassets/loading/白色转动16.imageset/转动16-1.png is not packaged
/Resource/CommonUI.xcassets/loading/白色转动17.imageset/转动17.png is not packaged
/Resource/CommonUI.xcassets/loading/白色转动17.imageset/转动17-1.png is not packaged
/Resource/CommonUI.xcassets/loading/白色转动17.imageset/转动17-2.png is not packaged
/Resource/CommonUI.xcassets/cancel_Register.imageset/cancel_Register@3x.png is not packaged
/Resource/CommonUI.xcassets/cancel_Register.imageset/cancel_Register@2x.png is not packaged
/Resource/CommonUI.xcassets/live_play.imageset/live_play.png is used

```

3. 工具探查遗漏冗余文件，这部分只能发现（开发过程，review过程中）一个移除一个：

1. import "NSDictionary+FakeBundleIdentifier.h"
2. import "DQTencentPlayerView.h"

3. import "LeXiuTanService.h"
4. import "SupportCollectionViewModel.h"

## 库文件，开发模式补充说明

### 工程中并无使用，建议移除

1. pod FSMachine
2. pod 'libextobjc/EXTKeyPathCoding'
3. pod 'HTHorizontalSelectionList'
4. pod 'NJKWebViewProgress'
5. pod 'StyledPageControl'

### Debug环境下引入的库可以再release版本中进行移除,记得刷新

1. pod 'FBMemoryProfiler', :configurations => ['Debug']
2. pod 'LumberjackConsole', :configurations => ['Debug']

### 待验证或可替代三方库

1. 确定可以替代移除库  
pod 'UIColor-Utilities' (colorWithHexString 可当度添加接口)  
pod 'NSString-Hashes' (接口合并到Ninty库中)  
pod 'OpenUDID' (接口合并到Ninty库中)

2. 待进一步确认：  
pod 'libextobjc/EXTScope'  
pod 'libextobjc/EXTKeyPathCoding'

[研究参考](#)

pod 'CocoaLumberjack'

[研究参考](#)

### 预期效果

1. 减少启动pre-main() 耗时。
2. 减小工程包大小。

## Part2. didFinishLaunchingWithOptions

### 优化点：

处理好优先顺序，前后台任务分类：

#### 1. 初始化工具库

2. 第三方库

3. 配置APP运行环境

4. 任务线程管理

## reference

1. [iOS启动时间优化](#)

2. [动态库-静态库](#)