Ant Technology

Access iOS

User Guide

Document Version: 20240808

Legal disclaimer

Document conventions

Style	Description	Example
⚠ **Danger**	A danger notice indicates a situation that will cause major system changes, faults, physical injuries, and other adverse results.	⚠ **Danger:** Resetting will result in the loss of user configuration data.
🔔 **Warning**	A warning notice indicates a situation that may cause major system changes, faults, physical injuries, and other adverse results.	🔔 **Warning:** Restarting will cause business interruption. About 10 minutes are required to restart an instance.
📢 **Notice**	A caution notice indicates warning information, supplementary instructions, and other content that the user must understand.	📢 **Notice:** If the weight is set to 0, the server no longer receives new requests.
? **Note**	A note indicates supplemental instructions, best practices, tips, and other content.	? **Note:** You can use Ctrl + A to select all files.
>	Closing angle brackets are used to indicate a multi-level menu cascade.	Click **Settings**> **Network**> **Set network type**.
Bold	Bold formatting is used for buttons , menus, page names, and other UI elements.	Click **OK**.
`Courier font`	Courier font is used for commands	Run the `cd /d C:/window` command to enter the Windows system folder.
Italic	Italic formatting is used for parameters and variables.	`bae log list --instanceid` *Instance_ID*
[] or [a|b]	This format is used for an optional value, where only one item can be selected.	`ipconfig [-all|-t]`
{} or {a|b}	This format is used for a required value, where only one item can be selected.	`switch {active|stand}`

Table of Contents

1.Integration method introduction

Based on the progress and application scenarios of the iOS development project, you are recommended to integrate the mPaaS mobile development platform by using CocoaPods based on the existing project.

According to the progress and usage scenarios of iOS development project, we recommend you to use the method of **Integrate by using CocoaPods based on the existing project** to Integrate mPaaS.

Integrate by using CocoaPods based on the existing project

If the existing project uses Cocoapods to manage SDK dependencies, we recommend that you use Cocoapods to access. For the procedure, see Integrate by using CocoaPods based on the existing project.

In iOS, mPaaS uses the Objective-C development language. If your project uses the Swift development language, you can introduce mPaaS Objective-C code by bridging.

Note

If you encounter problems on mPaaS integration, please search the group number 31591197 with DingTalk to join DingTalk group for further communication.

2.Create an application

To use mPaaS, you must first create an app in the mPaaS console and download a configuration file.

Prerequisites

You have a developer account. For details about registering an account, see Register accounts.

Create an mPaaS app

1. Log on to the mPaaS console.

   > **Note**
   >
   > If you are using mPaaS on another platform (such as the Ant Financial open platform), log on to the mPaaS console of the corresponding platform.

2. Click the **Create an application** button.
3. Complete the app information.
   i. Enter the app name. Example: mPaaS Demo.
   ii. Click `+` to upload the app icon. You can skip this step, and the app will use the default icon in this case.
4. Click **OK** to finish creating the app. The application you just created is displayed.

Download the configuration file

1. On the app list page, click the name of the created app (such as the mPaaS Demo app created in the previous step), and the following page appears:
   - The app name appears at the top left, where you can switch apps.
   - The left side of the page displays a list of component services provided by mPaaS.
2. Click **iOS code configuration** button to go to the **Connect mPaaS to my application** page.
3. On the **Connect mPaaS to my application** page, click **download the configuration file** to go to the **Code Configuration** page.
4. On the **Code configuration** page, enter **Bundle ID**, click the **Download configuration** button, and download the app configuration file in `.config` format to the local computer for subsequent development.

   The content of the downloaded configuration file is in `JSON` format, as shown in the following example:

```
{
 "appId":"ALIHK570DA89071940",
 "appKey":"ALIHK570DA89071940_IOS",

"base64Code":"/9j/4AAQSkZJRgABAQEAYABgAAD/2wBDAAMCAgMCAgMDAwMEAwMEBQgFBQQEBQoHBwYIDAoMD
KCwsNDhIQDQ4RDgsLEBYQERMUFRUVDA8XGBYUGBIUFRT/2wBDAQMEBAUEBQkFBQkUDQsNFBQUFBQUFBQUFBQUFB
FBQUFBQUFBQUFBQUFBQUFBQUFBQUFBQUFBQUFBQUFBT/wAARCAADAAMDASIAAhEBAxEB/8QAHwAAAQUBAQE
QEAAAAAAAAAAAECAwQFBgcICQoL/8QAtRAAAgEDAwIEAwUFBAQAAAF9AQIDAAQRBRIhMUEGE1FhByJxFDKBkaEI
KxwRVS0fAkM2JyggkKFhcYGRolJicoKSo0NTY3ODk6Q0RFRkdISUpTVFVWV1hZWmNkZWZnaGlqc3R1dnd4eXqDh
Gh4iJipKTlJWWl5iZmqKjpKWmp6ipqrKztLW2t7i5usLDxMXGx8jJytLT1NXW19jZ2uHi4+Tl5ufo6erx8vP09f
+Pn6/8QAHwEAAwEBAQEBAQEBAQAAAAAAAAECAwQFBgcICQoL/8QAtREAAgECBAQDBAcFBAQAAQJ3AAECAxEEBSE
hJBUQdhcRMiMoEIFEKRobHBCSMzUvAVYnLRChYkNOEl8RcYGRomJygpKjU2Nzg5OkNERUZHSElKU1RVVldYWVpj
VmZ2hpanN0dXZ3eHl6goOEhYaHiImKkpOUlZaXmJmaoqOkpaanqKmqsrO0tba3uLm6wsPExcbHyMnK0tPU1dbX2
a4uPk5ebn6Onq8vP09fb3+Pn6/9oADAMBAAIRAxFobXF3cwBkmTrM0HmXQB+kBWPpNmkFAwABAQAAAAQAAB4AAA
AAAADAAAAIgAAAABAAAAAAAAAAAAAAAAAAAAAAAABUAAAABAAAAAAAAAAAAAAAIAAAAAAAAAANHdTmJ3AAAAAAA
AAAAADxaH5QCq+leJs3obVk3cvGfEt4FOAk+nk5+NcRqlEem7mc7MRMkTznyN2cLbpn8zaya0uSj0UMyD3j2ed1
djbngBAwF4dWZ3AwECBgEAEQEBCAFxdHNqb3ZxMnz0IBFj0fFkf+Z52g7YGBKQcQVacXVC9I6zKuUFgYCYm42oQ
6utsiYv8Us68EQLL8fqzFPc8DZHdMUZuIpcECb+8/sdzvUl4/0YXe9HqTi2ytqojztIq9GUgmvDBYeZsCPJIdfK
FjGxp/bo6uhZIrjM5z4+eowoG9vwhVH/fbZ0rYY6zGr5L2IbB+TOOcHC9gH+druENFlgO7sY87UD4ApfgMf7d6f
HGjmBq1k/iQzYK2mCuznJpEKPZWf2bqTnVS2/r71P8AAMKgGAYAAAAA",
 "bundleId":"YourBundleID",
 "rootPath":"mpaas/ios/ALIHK570DA89071940-default",
 "workspaceId":"default",
 "syncport":"443",
 "syncserver":"msync.mpaas.cn-hongkong.aliyuncs.com",
 "pushPort":"443",
 "pushGW":"push.mpaas.cn-hongkong.aliyuncs.com",
 "rpcGW":"https://mgw.mpaas.cn-hongkong.aliyuncs.com/mgw.htm",
 "logGW":"https://mdap.mpaas.cn-hongkong.aliyuncs.com",
 "mpaasapi":"https://mpaasapi.mpaas.cn-hongkong.aliyuncs.com/mgw.htm",
 "mpaasConfigVersion":"V_1.0",
 "mpaasConfigEnv":"INTL_HK_CLOUD",
 "mpaasConfigPluginExpired":"",

"mpaasConfigLicense":"OI1Ozzu18RK2Gjewf3jnmSzPS3yTAdQdxbALtSPG6pkFHHIFgX2St2YijIKphcocs
UVIvnELOCTP5peXbJc1XoN3jZ8S1slPrwwJYhdf/RxnZuuADJdGwg2c+Voe0Y34nk4g8EN1LhzXpql+88XMr4mI
ZA3ldaqAuVIsvRhD44u+/JynB98LDU/X0slFhlYNDxL2tWWynhdVPICxY0BQjtDYqazJvJywfL3+YWDDYxQtQC5
fEiukLs0apTgA0V/568++QDAv15PE9Cl63UwufbLEyJfH7QnaSga5b7/v7Ciyy6DPrIWV6eb4SwuVO/g9RB3QHg
GKMSupAQ=="
}
```

3.Integrate by using CocoaPods based on the existing project

This section describes how to generate configurations based on the native plug-in extension mechanism of CocoaPods to quickly integrate mPaaS.

Prerequisites

- CocoaPods 1.0.0 or a later version has been installed. The project to be connected is the CocoaPods project.
- The CocoaPods mPaaS plug-in has been installed. If the plug-in has not been installed, run the following command to install it.

```
sh <(curl -s http://mpaas-ios.oss-cn-
hangzhou.aliyuncs.com/cocoapods/installmPaaSCocoaPodsPlugin.sh)
```

- An application has been created in the console, and the `.config` configuration file has been downloaded. For more information, see Create an application in the console.

Procedure

1. Copy the `.config` configuration file to the root directory (at the same level with `Podfile`) of the project.

   Note

   Please ensure the `.config` file’s filename is ending with iOS. If it is ending with ios, it needs to be updated to iOS manually.

2. Run the `pod mpaas init` command to automatically process the `Podfile` file and add `plugin` , `source` , and `mPaaS_baseline` configurations. The code for automatic configuration is as follows:

```
plugin "cocoapods-mPaaS"
source 'https://gitee.com/mpaas/podspecs.git'
mPaaS_baseline 'x.x.x'
```

3. Configure the `Podfile` file.
   i. Modify `mPaaS_baseline` to specify the mPaaS baseline.

      For example, in `mPaaS_baseline '10.2.3'` , `10.2.3` is the baseline version. For version differences, see Release Note.

   ii. Use `mPaaS_pod` to add mPaaS component dependencies.

      For example, in `mPaaS_pod "mPaaS_Nebula"` , `mPaaS_Nebula` is a component name. The following table shows more component names.

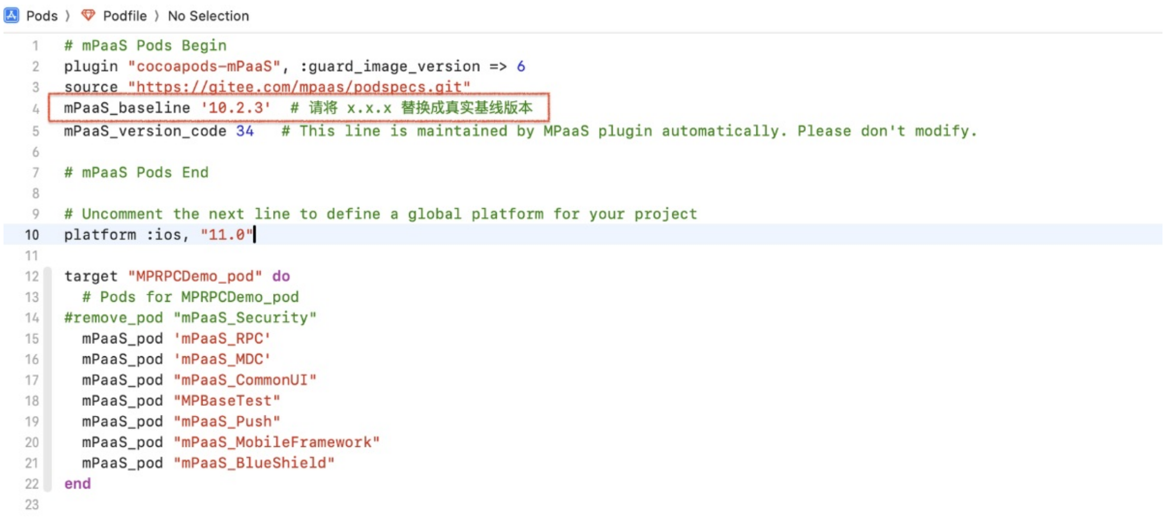
Component Configuration	Applicable Baseline	Description

mPaaS_pod "mPaaS_LocalLog"	10.1.32+	Local log.
mPaaS_pod "mPaaS_Log"	10.1.32+	Mobile analysis: behavior log, automation log, Crash log, and performance log analysis.
mPaaS_pod "mPaaS_Diagnosis"	10.1.32+	Diagnosis: Client diagnosis and analysis.
mPaaS_pod "mPaaS_RPC"	10.1.32+	Mobile gateway: provides download, upload, RPC call and other functions.
mPaaS_pod "mPaaS_Sync"	10.1.32+	Mobile synchronization: long connection service.
mPaaS_pod "mPaaS_Push"	10.1.32+	Message push.
mPaaS_pod "mPaaS_Config"	10.1.32+	Switch configuration: pull the corresponding value from the server based on the key to dynamically control the client logic.
mPaaS_pod "mPaaS_Upgrade"	10.1.32+	Upgrade release: provides convenient service to proactively detect and upgrade, which can be used for daily phased release and online new version update reminder.
mPaaS_pod "mPaaS_Share"	10.1.32+	Sharing: supports sharing text and pictures to well-known channels such as Weibo, DingTalk, and Alipay friends.
mPaaS_pod "mPaaS_Nebula"	10.1.32+	HTML5 container and offline package: Nebula container, which supports interaction between the front end and the native.
mPaaS_pod "mPaaS_UTDID"	10.1.32+	Device ID: easily and quickly obtained for the application to find a specific device safely and effectively.

mPaaS_pod "mPaaS_DataCenter"	10.1.32+	Unified storage: provides secure, fast, encryptable KV storage that supports multiple data types. The database DAO supports multiple solutions for persistent data storage.
mPaaS_pod "mPaaS_ScanCode"	10.1.32+	Code scan: quickly identifies QR codes and barcodes.
mPaaS_pod "mPaaS_LBS"	10.1.32+	Mobile positioning: positioning solution for mobile clients.
mPaaS_pod "mPaaS_CommonUI"	10.1.32+	Universal UI: universal UI component library that provides various UI components.
mPaaS_pod "mPaaS_BadgeService"	10.1.32+	Badge: badge reminder component of the client, which supports reminder styles such as badge, number, and New. It can automatically manage the badge relationship of a tree structure.
mPaaS_pod "mPaaS_AlipaySDK"	10.1.32+	Quick Pay function of Alipay: quick payment platform of Alipay.
mPaaS_pod "mPaaS_Multimedia"	10.1.32+	Multimedia component: supports image download, upload, cache and other functions.
mPaaS_pod "mPaaS_MobileFramework"	10.1.32+	Mobile framework: client application framework, sub-app management, multi-tab application management, third-party redirection management, viewController redirection, and exception handling and reporting.
mPaaS_pod "mPaaS_OpenSSL"	10.1.32+	OpenSSL
mPaaS_pod "mPaaS_TinyApp"	10.1.32+	Applets: integrates lease capabilities.

mPaaS_pod "MPBaseTest"	10.1.32+	Basic test: basic test module.
mPaaS_pod "mPaaS_CDP"	10.1.32+	Intelligent delivery: configure various intelligent advertisements and presentations to the clients with dynamic launches.
mPaaS_pod "mPaaS_AliAccount"	10.1.60+	Mini program: publish the mini program
mPaaS_pod "mPaaS_ARTVC"	10.1.68	Voice call and video call: Voice call and video call components. This feature supports two-party video calls, group video calls and online conferences.
mPaaS_pod "mPaaS_BlueShield"	10.2.3+	Blue Shield encryption component: Add the absBase64Code parameter in the config file to automatically generate a Blue Shield image.
mPaaS_pod "mPaaS_MDC"	10.2.3+	Mobile Dispatch component: Fine-grained domain name strategic scheduling.

See the following example of complete Podfile:



```
# mPaaS Pods Begin
plugin "cocoapods-mPaaS", :guard_image_version => 6
source "https://gitee.com/mpaas/podspecs.git"
mPaaS_baseline '10.2.3'  # 请将 x.x.x 替换成真实基线版本
mPaaS_version_code 34   # This line is maintained by MPaaS plugin automatically. Please don't modify.

# mPaaS Pods End

# Uncomment the next line to define a global platform for your project
platform :ios, "11.0"

target "MPRPCDemo_pod" do
  # Pods for MPRPCDemo_pod
#remove_pod "mPaaS_Security"
  mPaaS_pod 'mPaaS_RPC'
  mPaaS_pod 'mPaaS_MDC'
  mPaaS_pod "mPaaS_CommonUI"
  mPaaS_pod "MPBaseTest"
  mPaaS_pod "mPaaS_Push"
  mPaaS_pod "mPaaS_MobileFramework"
  mPaaS_pod "mPaaS_BlueShield"
end

```

4. Execute `pod mpaas update x.x.x` in the command line, `x.x.x` is the version number of configured baseline, such as `10.2.3` .
5. Execute `pod install` to complete integration. You can also add `--verbose` to view log details.

> **Note**
>
> If you are prompted when you execute `pod install` that you cannot find the library imported from GitHub's official website, specify the source address for the official GitHub Source at the beginning of podfile: `https://github.com/CocoaPods/Specs.git` .

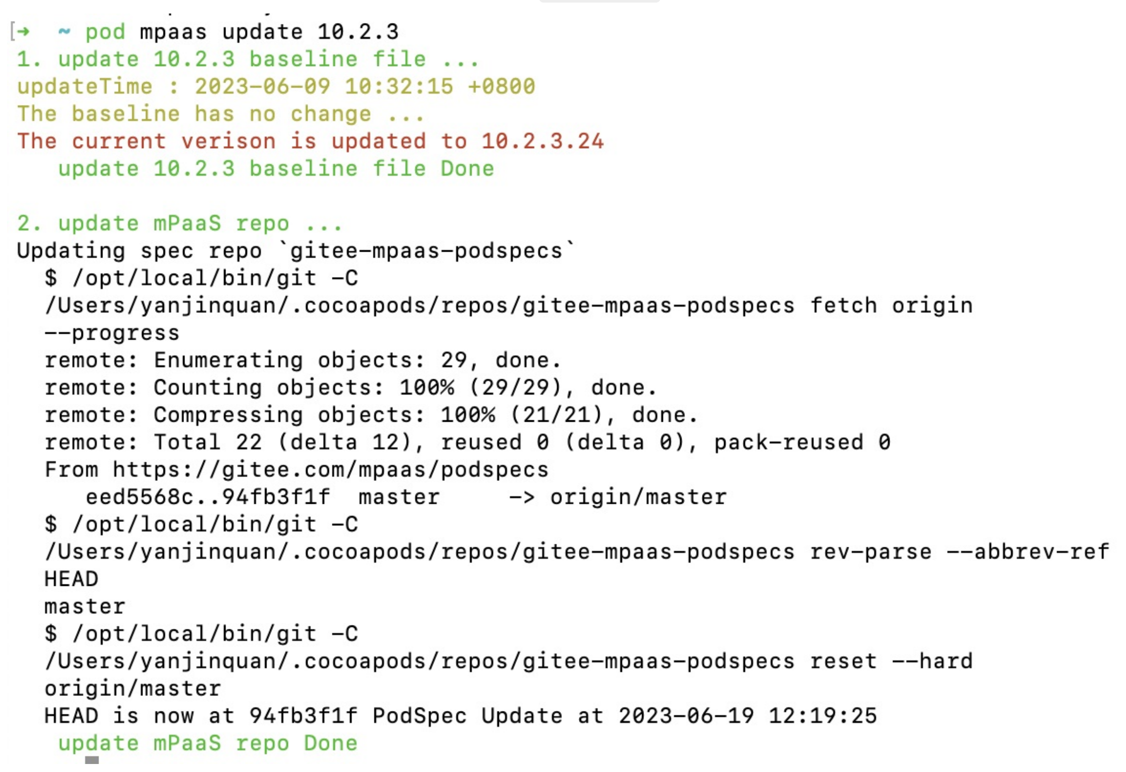
6. If you find the third-party library conflicts after accessing it, you can remove the specific third-party library. For the specific operation, see iOS conflict processing.

Upgrading instructions

When a new version of mPaaS is published, you can select the upgrading components, or the general upgrading baseline (namely SDK version).

Upgrading components

1. When you execute `pod mpaas update x.x.x` in the command line, `x.x.x` is the baseline version number currently in use, such as `10.2.3` .

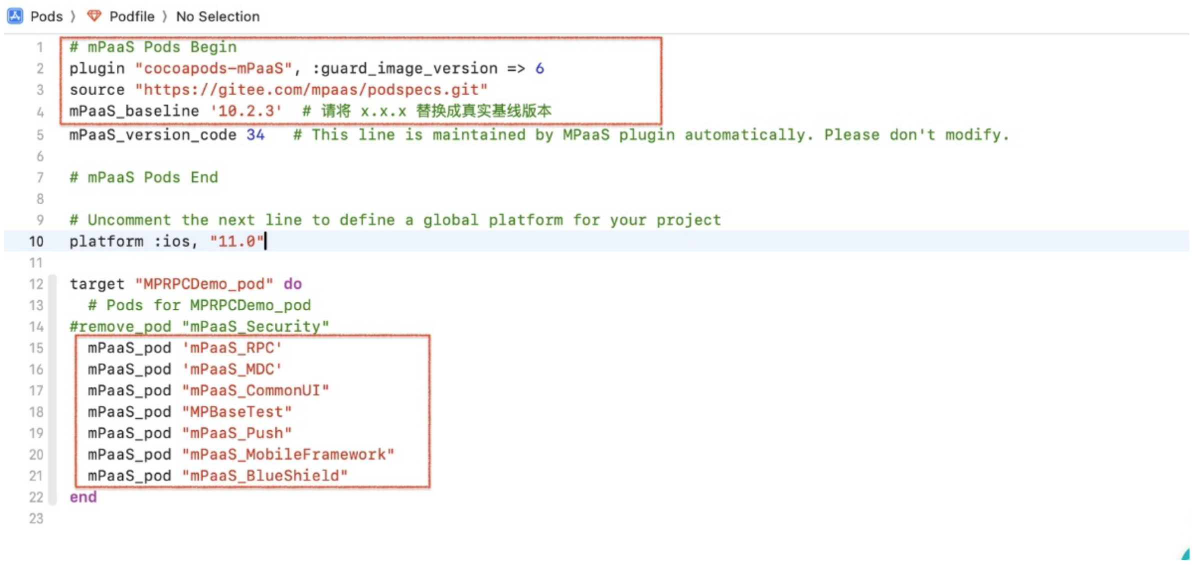


```
[→  ~ pod mpaas update 10.2.3
 1. update 10.2.3 baseline file ...
 updateTime : 2023-06-09 10:32:15 +0800
 The baseline has no change ...
 The current verison is updated to 10.2.3.24
    update 10.2.3 baseline file Done

 2. update mPaaS repo ...
 Updating spec repo `gitee-mpaas-podspecs`
   $ /opt/local/bin/git -C
   /Users/yanjinquan/.cocoapods/repos/gitee-mpaas-podspecs fetch origin
   --progress
   remote: Enumerating objects: 29, done.
   remote: Counting objects: 100% (29/29), done.
   remote: Compressing objects: 100% (21/21), done.
   remote: Total 22 (delta 12), reused 0 (delta 0), pack-reused 0
   From https://gitee.com/mpaas/podspecs
      eed5568c..94fb3f1f  master     -> origin/master
   $ /opt/local/bin/git -C
   /Users/yanjinquan/.cocoapods/repos/gitee-mpaas-podspecs rev-parse --abbrev-ref
   HEAD
   master
   $ /opt/local/bin/git -C
   /Users/yanjinquan/.cocoapods/repos/gitee-mpaas-podspecs reset --hard
   origin/master
   HEAD is now at 94fb3f1f PodSpec Update at 2023-06-19 12:19:25
    update mPaaS repo Done
```

2. Execute `pod install` to complete upgrading for the corresponding components under this baseline.

Upgrade the baseline

1. In `podfile` , modify the corresponding baseline number of `mPaaS_baseline` to complete upgrading for the general baseline. For example, you can modify the baseline number from `10.1.68` to `10.2.3` . The baseline number supports the standard or custom baseline.



```
# mPaaS Pods Begin
plugin "cocoapods-mPaaS", :guard_image_version => 6
source "https://gitee.com/mpaas/podspecs.git"
mPaaS_baseline '10.2.3'  # 请将 x.x.x 替换成真实基线版本
mPaaS_version_code 34   # This line is maintained by MPaaS plugin automatically. Please don't modify.

# mPaaS Pods End

# Uncomment the next line to define a global platform for your project
platform :ios, "11.0"

target "MPRPCDemo_pod" do
  # Pods for MPRPCDemo_pod
#remove_pod "mPaaS_Security"
  mPaaS_pod 'mPaaS_RPC'
  mPaaS_pod 'mPaaS_MDC'
  mPaaS_pod "mPaaS_CommonUI"
  mPaaS_pod "MPBaseTest"
  mPaaS_pod "mPaaS_Push"
  mPaaS_pod "mPaaS_MobileFramework"
  mPaaS_pod "mPaaS_BlueShield"
end
```

2. Execute `pod install` to complete baseline upgrading.

mPaaS iOS podspec address switch

Background

The original podspec storage warehouse `code.aliyun.com` used by mPaaS has ceased service (updates will cease on June 1, 2023, and services will cease on June 30, 2023).

Continuing to use the original repo will have the following impacts:

1. When using the mPaaS pod plugin for SDK update, the latest version of each baseline cannot be pulled;
2. After 2023.06.30, using the mPaaS pod plugin cannot pull to any baseline version.

Currently mPaaS has supported all mPaaS versions on `gitee.com` .

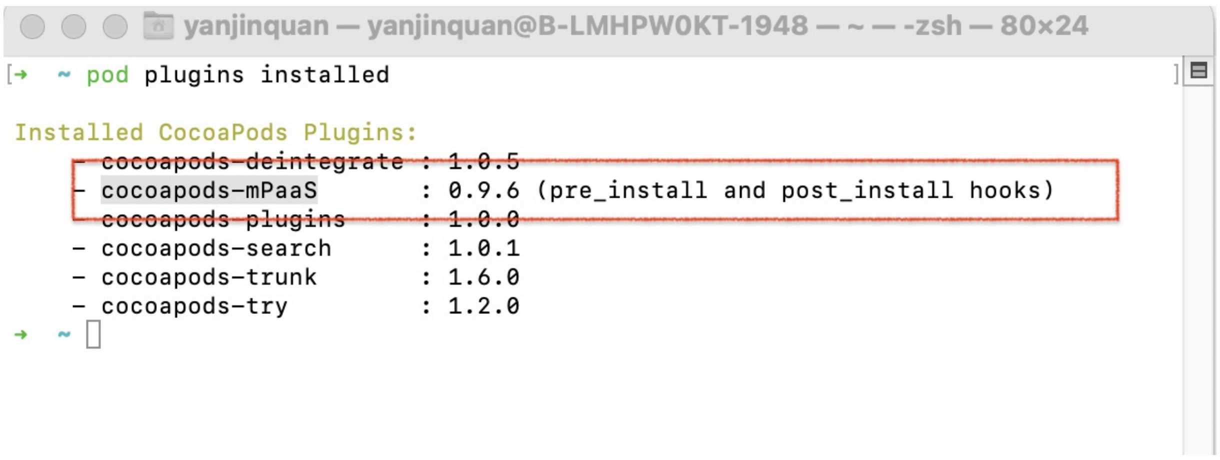
Solutions

Upgrade mPaaS pod plugin

Execute the following command to update to the latest mPaaS pod plugin.

```
sh <(curl -s http://mpaas-ios.oss-cn-hangzhou.aliyuncs.com/cocoapods/installmPaaSCocoaPodsPlugin.sh)
```

After the execution is complete, execute the `pod plugins installed` command in the terminal to check the version of cocoapods-mPaaS. If it shows `0.9.6` or above, the upgrade is successful.


```
yanjinquan — yanjinquan@B-LMHPW0KT-1948 — ~ — -zsh — 80×24
[→  ~ pod plugins installed

Installed CocoaPods Plugins:
    - cocoapods-deintegrate : 1.0.5
    - cocoapods-mPaaS       : 0.9.6 (pre_install and post_install hooks)
    - cocoapods-plugins     : 1.0.0
    - cocoapods-search      : 1.0.1
    - cocoapods-trunk       : 1.6.0
    - cocoapods-try         : 1.2.0
→  ~ 
```

Modify the source configuration in podfile

Replace the origin `source "https://code.aliyun.com/mpaas-public/podspecs.git"` in podfile with `source "https://gitee.com/mpaas/podspecs.git"` .

API change

This modification only involves the change of the plugin, and there is no change in the use of plugin commands.

Test validation

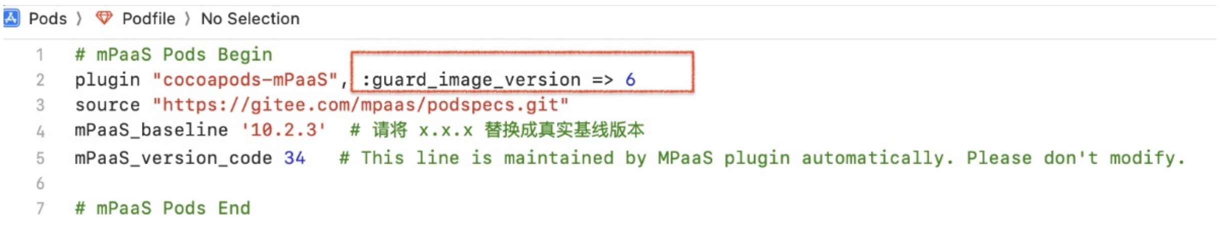
After completing the above upgrade and modification configuration operations, you can continue to execute the mPaaS pod plugin related pull command to test whether the latest baseline version and SDK can be pulled.

Parameter list

You can change some default behaviors of the plug-in by configuring parameters.

Usage:

Add parameters in the back end of the `plugin "cocoapods-mPaaS"` . See the following examples:



```
# mPaaS Pods Begin
plugin "cocoapods-mPaaS", :guard_image_version => 6
source "https://gitee.com/mpaas/podspecs.git"
mPaaS_baseline '10.2.3'  # 请将 x.x.x 替换成真实基线版本
mPaaS_version_code 34   # This line is maintained by MPaaS plugin automatically. Please don't modify.

# mPaaS Pods End
```

Parameters	Function	Applicable versions
`:guard_image_version => 6`	Generate V6 guard image	≥ V0.9.6
`:guard_image_version => 5`	Generate V5 guard image	≥ V0.9.6

`:only_frameworks => true`	In some scenarios (such as the independent framework project), you do not need to add directory files with mPaaS template.	≥ V0.9.5.0.0.2
`:check_repo => false`	In some cases (such as using an intranet proxy), the default added repo is not automatically checked.	≥ V0.9.5.0.0.2

Note

10.2.3 The baseline version does not need to set `:guard_image_version`, and generates V6 images by default.

Command list

After installing the cocoapods-mPaaS plug-in, you can use command line tools to assist your development.

Command	Function
`pod mpaas init`	In `Podfile`, add `plugin`, `source` and `mPaaS_baseline`.
`pod mpaas update <VERSION>`	Upgrade the baseline. The parameter `<VERSION>` is the specific baseline number such as 10.2.3. Then upgrade the podspec library.
`pod mpaas update --all`	In the official version of the plug-in, this command will upgrade the plug-in, and run the installation script again. In the beta version of the plug-in, this command will implement features of the official version, and upgrade the local baseline.
`pod mpaas info`	Show the complete information of the baseline and the corresponding component.
`pod mpaas info <NAME> <VERSION>`, in which `<VERSION>` is optional.	Filter the information about a module name.
`pod mpaas info --only-mPaaS`	Show some default baseline information, which is easy to be pasted to Podfile.

`pod mpaas open`	Directly open the `.xcworkspace` file from the command line.
`pod mpaas version`	Show the complete baseline used in the current project.
`pod mpaas version --plugin`	Show the version number of the current cocoapods-mPaaS plug-in.

4.Advanced guide

4.1. mPaaS directory structure

After importing the cloud data to a mPaaS-iOS-framework-based project or a native-framework-based project, the following directory is added to the project directory.

> **Note**
>
> In versions 10.1.32 and above, among all the directories under **MPaaS** > **Targets** > **mPaaSDemo**, only `APMobileFramework` and `mPaas` are kept. If you upgrade from an earlier version, the directories and categories of the other components will no longer be generated.

Directory structure is as follows:

```
└── MPaaS
    ├── mpaas_sdk.config
    ├── Targets
    |    └── mPaaSDemo (Project Target name)
    |        ├── mPaaSDemo-mPaaS-Headers.h
    |        ├── mPaaSDemo-Prefix.pch
    |        ├── APMobileFramework
    |        ├── mPaas
    |        ├── meta.config
    |        └── yw_1222.jpg
    ├── Resources
    └── Frameworks
```

In the above directory:

- `mpaas_sdk.config` : Information about the modules added in the current project, including version, added time, resource file, and so on, which are automatically maintained by the mPaaS plugin. Do not modify it manually.
- `mPaaSDemo-mPaaS-Headers.h` : Header file of the mPaaS module that the current project depends on, which is automatically maintained by the mPaaS plugin. Do not modify it manually.
- `mPaaSDemo-Prefix.pch` : The reference of pch file, automatically adding `mPaaSdemo-mPaaS-Headers.h` into the mPaaS module's header file.
- `APMobileFramework` : The category managed by the lifecycle of mPaaS framework.
- `mPaas` : The category of `MPaaSInterface` .
- `meta.config` : The cloud metadata downloaded from mPaaS console.
- `yw_1222.jpg` : The security guard signature verification image generated through the base64code field in the metadata, used in mobile gateway signature verification. You can delete this image if you don't need mobile gateway.
- `Resources & Frameworks` : The mPaaS module's resource file and binary file directory, serving as the union of mPaaS modules used by all Targets in the current project. They are automatically maintained by the mPaaS plugin. Do not modify it manually.

Note

Since all Targets share the same `Resources & Frameworks`, different Targets cannot use different versions of the same module simultaneously. Do not modify these two directories. The framework added to `Build Phase` varies by the module selected by each Target.

4.2. mPaaS iOS framework

mPaaS iOS framework originates from the development framework of Alipay client. In line with the design idea of Framework, mPaaS iOS isolates business into multiple relatively independent modules and aims for achieving high cohesion and low coupling between modules.

mPaaS iOS framework directly takes over the lifecycle of application, and responsible for Host startup, managing application lifecycle, processing and distributing the delegate events of `UIApplication`, managing each business modules (MicroApplication and Services) in a unified way, etc.

This article gives a detailed introduction to the mPaaS iOS framework.

Host startup

Through the replacement of the main function of the program, the lifecycle of the application is directly taken over. The whole startup process is as follows:

```
main -> DFClientDelegate -> Open Launcher application
```

Application lifecycle management

After you access mPaaS framework, it completely replaces `AppDelegate`. The entire lifecycle of the application is managed by the framework, but you can still implement the delegate methods in different stages of the application’s lifecycle. The framework provides the access method for all delegate methods in the `UIApplicationDelegate`, you only need to override the corresponding method in `Category`.

The life cycle method is declared as follows (see `DTFrameworkInterface.h` file for more information):

```
/**
 *  The framework needs to implement certain initialization logic in
didFinishLaunching, but this method will be called before execution.
 */
- (void)application:(UIApplication *)application beforeDidFinishLaunchingWithOptions:(N
SDictionary *)launchOptions;

/**
 *  The framework calls back this method, making the accessed application taking over i
ts own didFinishLaunching logic.
 *  When DTFrameworkCallbackResultReturnYES or DTFrameworkCallbackResultReturnNO is ret
urned, they are directly returned to the system, without executing the subsequent logic
.
 *  This method is called back before starting BootLoader, application can make the fra
mework exit in advance by returning DTFrameworkCallbackResultReturnYES or
DTFrameworkCallbackResultReturnNO, without running the default BootLoader.
 *  Use the default implementation in the framework, override is normally not required.
 *
 *  @return : To continue run the framework, or return YES/NO to the system.
 */
- (DTFrameworkCallbackResult)application:(UIApplication *)application
handleDidFinishLaunchingWithOptions:(NSDictionary *)launchOptions;

/**
 *  The framework needs to implement certain initialization logic in
didFinishLaunching, but this method will be called after all the logics are done.
 */
- (void)application:(UIApplication *)application afterDidFinishLaunchingWithOptions:(NS
Dictionary *)launchOptions;

/**
 *  The framework calls back this method in advance, allowing the accessed application
to process the notification message in advance.
 *  When DTFrameworkCallbackResultContinue is returned, the framework broadcasts the me
ssage to global listeners through UIApplicationDidReceiveRemoteNotification, and calls
completionHandler(UIBackgroundFetchResultNoData).
 *  When DTFrameworkCallbackResultReturn is returned, it means the accessed application
has completely processed the message, and the framework stops executing the subsequent
logic.
 */
- (DTFrameworkCallbackResult)application:(UIApplication *)application
didReceiveRemoteNotification:(NSDictionary *)userInfo fetchCompletionHandler:(void (^)(
UIBackgroundFetchResult result))completionHandler;

/**
 *  The framework calls back this method in advance, allowing the accessed application
to process the notification message in advance.
 *  When DTFrameworkCallbackResultContinue is returned, the framework broadcasts the me
ssage to global listeners through UIApplicationDidReceiveLocalNotification.
 *  When DTFrameworkCallbackResultReturn is returned, it means the accessed application
has completely processed the message, and the framework stops executing the subsequent
logic.
 */
- (DTFrameworkCallbackResult)application:(UIApplication *)application
didReceiveLocalNotification:(UILocalNotification *)notification;

/**
 *  The framework calls back this method in advance, allowing the accessed application
to process the notification message in advance.
 *  When DTFrameworkCallbackResultContinue is returned, the framework broadcasts the me
ssage to global listeners through UIApplicationDidReceiveLocalNotification, and calls c
ompletionHandler().
 *  When DTFrameworkCallbackResultReturn is returned, it means the accessed application
has completely processed the message, and the framework stops executing the subsequent
logic.
 */
- (DTFrameworkCallbackResult)application:(UIApplication *)application
handleActionWithIdentifier:(NSString *)identifier forLocalNotification:
(UILocalNotification *)notification completionHandler:(void (^)())completionHandler;

/**
```

```
 *  The framework calls back this method in advance, allowing the accessed application
to get deviceToken.
 *  When DTFrameworkCallbackResultContinue is returned, the framework broadcasts the me
ssage to global listeners through UIApplicationDidRegisterForRemoteNotifications.
 *  When DTFrameworkCallbackResultReturn is returned, it means the accessed application
has completely processed, and the framework stops executing the subsequent logic.
 */
- (DTFrameworkCallbackResult)application:(UIApplication *)application
didRegisterForRemoteNotificationsWithDeviceToken:(NSData *)deviceToken;

/**
 *  The framework calls back this method in advance when it fails to obtain
deviceToken.
 *  When DTFrameworkCallbackResultContinue is returned, the framework continues to exec
ute, no other logic currently.
 *  When DTFrameworkCallbackResultReturn is returned, the framework stops executing the
subsequent logic, no other logic currently.
 */
- (DTFrameworkCallbackResult)application:(UIApplication *)application
didFailToRegisterForRemoteNotificationsWithError:(NSError *)error;

/**
 *  The framework notifies sharing component (if there is, and
shouldAutoactivateShareKit returns YES) in advance, if the sharing component cannot pro
cess it, this method is called back to allow the accessed application to process openUR
L.
 *  When DTFrameworkCallbackResultReturnYES or DTFrameworkCallbackResultReturnNO is ret
urned, the framework directly returns to the system, without executing the subsequent l
ogic.
 *  When DTFrameworkCallbackResultContinue is returned, the framework continues to proc
ess the URL, and distribute it to SchemeHandler and other classes for further processin
g.
 *
 *  Comparing with the system method, this method has an additional newURL parameter, a
llowing the application to return a different URL after processing. If the function ret
urns DTFrameworkCallbackResultContinue and assign value to newURL, the framework will u
se the new URL for subsequent processing.
 */
- (DTFrameworkCallbackResult)application:(UIApplication *)application openURL:(NSURL *)
url newURL:(NSURL **)newURL sourceApplication:(NSString *)sourceApplication annotation:
(id)annotation;

/**
 *  The framework calls back this method in advance.
 *  When DTFrameworkCallbackResultContinue is returned, the framework continues to exec
ute, no other logic currently.
 *  When DTFrameworkCallbackResultReturn is returned, the framework stops executing the
subsequent logic, no other logic currently.
 */
- (DTFrameworkCallbackResult)applicationWillResignActive:(UIApplication *)application;

/**
 *  The framework calls back this method in advance.
 *  When DTFrameworkCallbackResultContinue is returned, the framework continues to exec
ute, no other logic currently.
```

```
ute, no other logic currently.
 *  When DTFrameworkCallbackResultReturn is returned, the framework stops executing the
subsequent logic, no other logic currently.
 */
- (DTFrameworkCallbackResult)applicationDidEnterBackground:(UIApplication
*)application;

/**
 *  The framework calls back this method in advance.
 *  When DTFrameworkCallbackResultContinue is returned, the framework continues to exec
ute, no other logic currently.
 *  When DTFrameworkCallbackResultReturn is returned, the framework stops executing the
subsequent logic, no other logic currently.
 */
- (DTFrameworkCallbackResult)applicationWillEnterForeground:(UIApplication
*)application;

/**
 *  The framework calls back this method in advance.
 *  When DTFrameworkCallbackResultContinue is returned, the framework continues to exec
ute and give event to sharing component (if there is, and shouldAutoactivateShareKit re
turns YES). If the entire application is not loaded, BootLoader is called.
 *  When DTFrameworkCallbackResultReturn is returned, the framework stops executing the
subsequent logic, no other logic currently.
 */
- (DTFrameworkCallbackResult)applicationDidBecomeActive:(UIApplication *)application;

/**
 *  The framework calls back this method in advance.
 *  When DTFrameworkCallbackResultContinue is returned, the framework continues to exec
ute, no other logic currently.
 *  When DTFrameworkCallbackResultReturn is returned, the framework stops executing the
subsequent logic, no other logic currently.
 */
- (DTFrameworkCallbackResult)applicationWillTerminate:(UIApplication *)application;

/**
 *  The framework calls back this method in advance.
 *  When DTFrameworkCallbackResultContinue is returned, the framework continues to exec
ute, no other logic currently.
 *  When DTFrameworkCallbackResultReturn is returned, the framework stops executing the
subsequent logic, no other logic currently.
 */
- (DTFrameworkCallbackResult)applicationDidReceiveMemoryWarning:(UIApplication *)applic
ation;

/**
 *  The framework calls back this method in advance, allowing the accessed application
to process the Watch message in advance.
 *  When DTFrameworkCallbackResultContinue is returned, the framework broadcasts the Wa
tch message to global listeners through
UIApplicationWatchKitExtensionRequestNotifications.
 *  When DTFrameworkCallbackResultReturn is returned, it means the accessed application
has completely processed the message, and the framework stops executing the subsequent
logic.
```

```
 */
- (DTFrameworkCallbackResult)application:(UIApplication *)application
handleWatchKitExtensionRequest:(NSDictionary *)userInfo reply:(void(^)(NSDictionary *re
plyInfo))reply;

/**
 *  The framework calls back this method in advance, allowing the accessed application
to process the message in advance.
 *  When DTFrameworkCallbackResultContinue is returned, the framework broadcasts the me
ssage to global listeners through UIApplicationUserActivityNotifications, and returns N
O to the system in the end.
 *  When DTFrameworkCallbackResultReturnYES or DTFrameworkCallbackResultReturnNO is ret
urned, the framework directly returns to the system, without executing the subsequent l
ogic.
 */
- (DTFrameworkCallbackResult)application:(UIApplication *)application
continueUserActivity:(NSUserActivity *)userActivity restorationHandler:(void(^)(NSArray
*restorableObjects))restorationHandler;

/**
 *  The framework calls back this method in advance, allowing the accessed application
to process the message of 3D Touch quick entry in advance.
 *  When DTFrameworkCallbackResultContinue is returned, the framework processes the URL
brought by shortcutItem, and calls completionHandler() to return whether it has been pr
ocessed.
 *  When DTFrameworkCallbackResultReturn is returned, the framework directly returns to
the system, without executing the subsequent logic.
 */
- (DTFrameworkCallbackResult)application:(UIApplication *)application
performActionForShortcutItem:(UIApplicationShortcutItem *)shortcutItem
completionHandler:(void (^)(BOOL))completionHandler;

/**
 *  Background Fetch mechanism callback
 *  completionHandler must be called back in 30 seconds, otherwise the process will be
terminated.
 *  To enable this mechanism, you need to configure the fetch option of Background Mode
s, and then call the following method in didFinishLaunching. See documentation for more
information.
 *  [application
setMinimumBackgroundFetchInterval:UIApplicationBackgroundFetchIntervalMinimum];
 *  The default implementation is null, you need to process it in your own way.
 */
- (void)application:(UIApplication *)application performFetchWithCompletionHandler:(voi
d (^)(UIBackgroundFetchResult))completionHandler;
```

Division of application modules

mPaaS framework has defined MicroApplication and Service to separate different modules. Take “whether it has an UI interface” as criteria, the Framework classifies different modules into **MicroApplication** and **Service** and implements lifecycle management on the modules via **Context**.

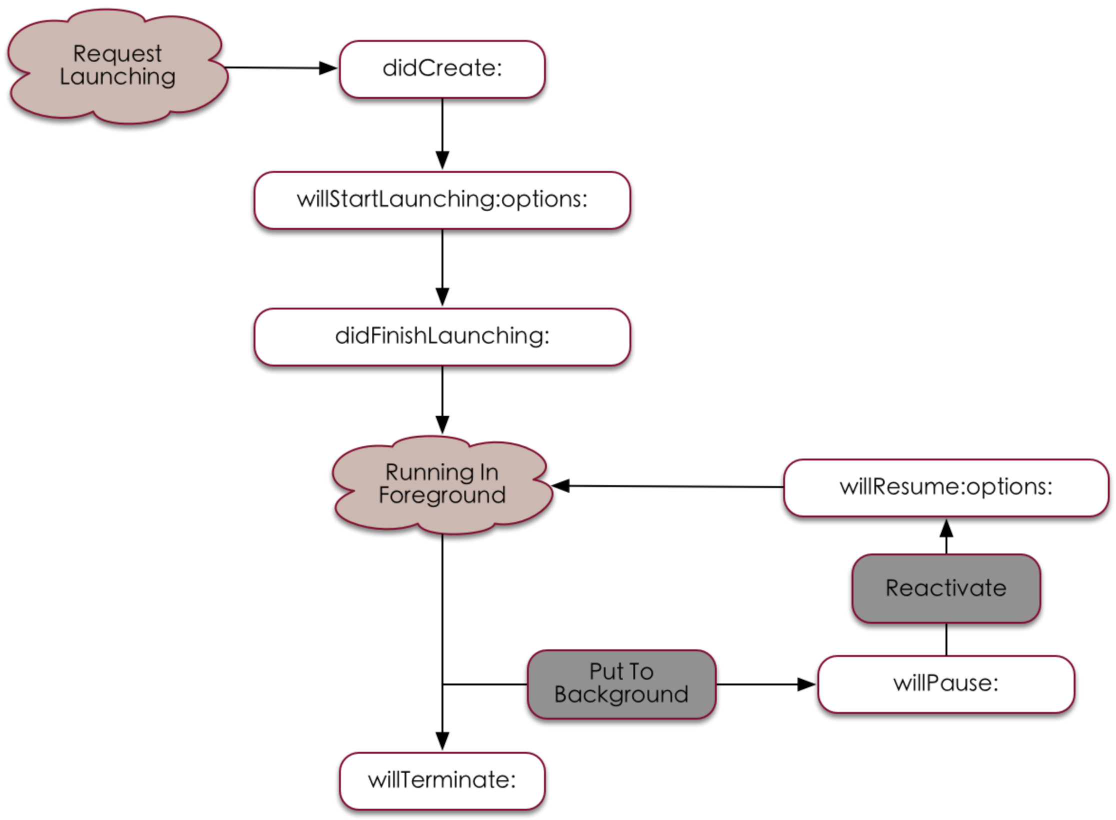
Terminology	Definition
MicroApplication	A micro application with UI on client at runtime
Service	Lightweight abstracted service provided by client at runtime
Context	Context of client micro-component at runtime

This section introduces the concepts of micro application, service, and context. See Create a micro application for more information.

MicroApplication

In the process of developing application based on mPaaS iOS framework, we generally set the independent service with UI as a micro application (e.g.: transfer, mobile top-up and other services in Alipay) and isolate it from other services to achieve high independence and zero interdependence among micro applications.

Each micro application has its own lifecycle. The overall process is as follows:



The callback methods of micro application through the whole lifecycle (see `DTMicroApplicationDelegate.h` file for more information):

```
@required
/**
```

```
/**
* Request the delegate of application object to return root view controller.
*
* @param application: Application object.
*
* @return: The root view controller of application.
*/
- (UIViewController *)rootControllerInApplication:(DTMicroApplication *)application;
@optional
/**
* Notify the application delegate that the application object has been instantiated.
*
* @param application: Application object.
*/
- (void)applicationDidCreate:(DTMicroApplication *)application;
/**
* Notify the application delegate that the application will be launched.
*
* @param application: Launched application object.
* @param options: Running parameters of the application.
*/
- (void)application:(DTMicroApplication *)application willStartLaunchingWithOptions:(NS
Dictionary *)options;
/**
* Notify the application delegate that the application is launched already.
*
* @param application: Launched application object.
*/
- (void)applicationDidFinishLaunching:(DTMicroApplication *)application;
/**
* Notify the application delegate that the application will be paused and put into back
ground.
*
* @param application: Launched application object.
*/
- (void)applicationWillPause:(DTMicroApplication *)application;
/**
* Notify the application delegate that the application will be reactivated.
*
* @param application: The application object to be activated.
*/
- (void)application:(DTMicroApplication *)application willResumeWithOptions:
(NSDictionary *)options;
/**
* Notify the application delegate that the application has been activated.
*
* @param application: The application object to be activated.
*/
- (void)applicationDidResume:(DTMicroApplication *)application;
/**
* Notify the application delegate that the application has been activated.
*
* @param application: The application object to be activated, together with parameter v
ersion.
*/
```

```
*/
- (void)application:(DTMicroApplication *)application didResumeWithOptions:
(NSDictionary *)options;
/**
* Notify the application delegate that the application will quit.
*
* @param application: Application object.
*/
- (void)applicationWillTerminate:(DTMicroApplication *)application;
/**
* Notify the application delegate that the application will quit.
*
* @param application: Application object.
* @param animated: Whether to quit in animated way.
*/
- (void)applicationWillTerminate:(DTMicroApplication *)application animated:
(BOOL)animated;
/**
* Inquire the application delegate whether the application can quit or not.
* Note: The delegate returns **NO** in some special cases. If it defaults to **Yes**, t
he application can quit.
*
* @param application: Application object.
*
* @return: Whether the application can quit or not.
*/
- (BOOL)applicationShouldTerminate:(DTMicroApplication *)application;
```

Service

mPaaS iOS framework regards the Framework without UI as service. The differences between microapplication and service are as follows:

- Microapplication serves as an independent business process while service is used to provide general service.
- Service is stateful. Once started, the service exists through the whole lifecycle of the client and can be acquired at any time; microapplication will be destroyed after exit.

Relevant interfaces of service management (see `DTService.h` file for more information):

```
@required
/**
* Start a service.
* Note:
* The framework will call the method after initialization.
* The service can start an application only when the method is called.
*/
- (void)start;
@optional
/**
* A service is created.
*/
- (void)didCreate;
/**
* The service will be destroyed.
*/
- (void)willDestroy;
```

Context

Context is the control center of the whole client framework, performing unified management on the interaction and jumps among micro applications and services, with the following responsibilities:

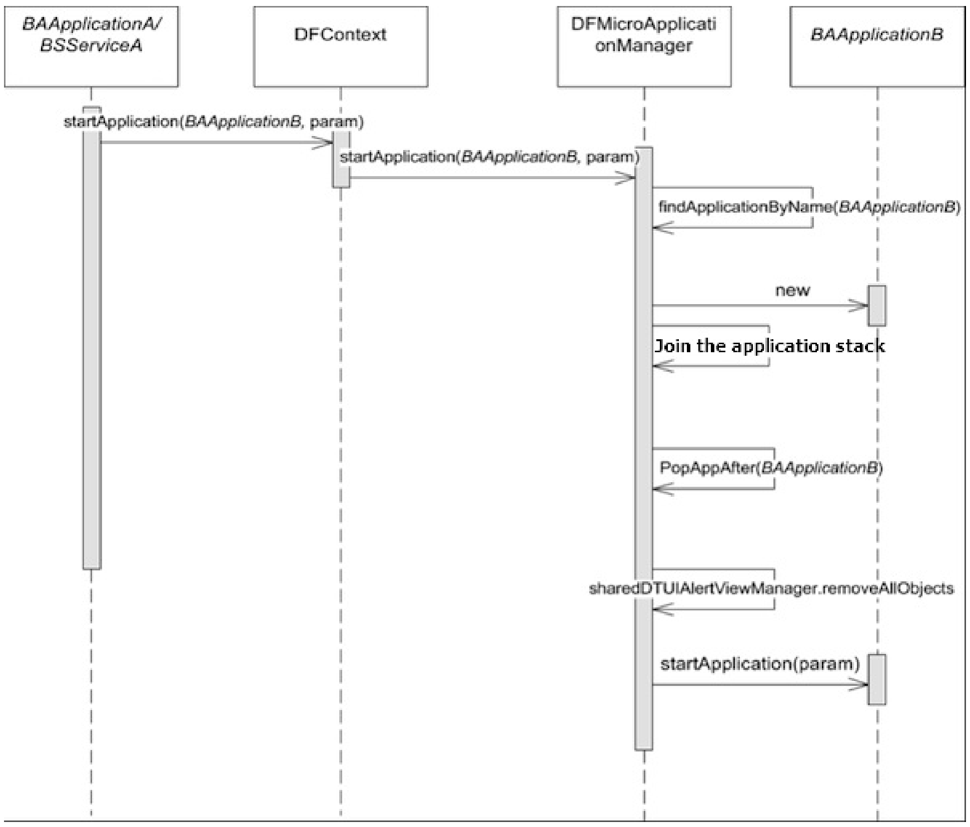
- Provide an interface for starting micro application. Users can quickly find, close and manage the jumps of the micro application through using name;
- Provide an interface for starting service, managing the registration, discovery and deregistration of services.

Manage micro application

- Relevant interfaces of micro application management (see `DTContext.h` file for more information):

```
/**
* Start an application as per the given name.
*
* @param name: Name of the application to be started.
* @param params: The parameters need to be forwarded to another application when an app
lication is started.
* @param animated: Specify whether to display animation when starting an application.
*
* @return: Return YES if the application is successfully started, otherwise NO.
*/
- (BOOL)startApplication:(NSString *)name params:(NSDictionary *)params animated:(BOOL)
animated;
/**
* Start an application as per the given name.
*
* @param name: Name of the application to be started.
* @param params: The parameters need to be forwarded to another application when an app
lication is started.
* @param launchMode: Specify the method of starting application.
*
* @return: Return YES if the application is successfully started, otherwise NO.
*/
- (BOOL)startApplication:(NSString *)name params:(NSDictionary *)params launchMode:(DTM
icroApplicationLaunchMode)launchMode;
/**
* Find the specified application.
*
* @param name: Name of the application to find.
*
* @return: Return corresponding application object if the specified application is in t
he application stack, otherwise nil.
*/
- (DTMicroApplication *)findApplicationByName:(NSString *)name;
/**
* Return the application which is on the top of the stack currently, namely the applica
tion visible to users.
*
* @return: Current visible applications.
*/
- (DTMicroApplication *)currentApplication;
```

- Micro application starting process:

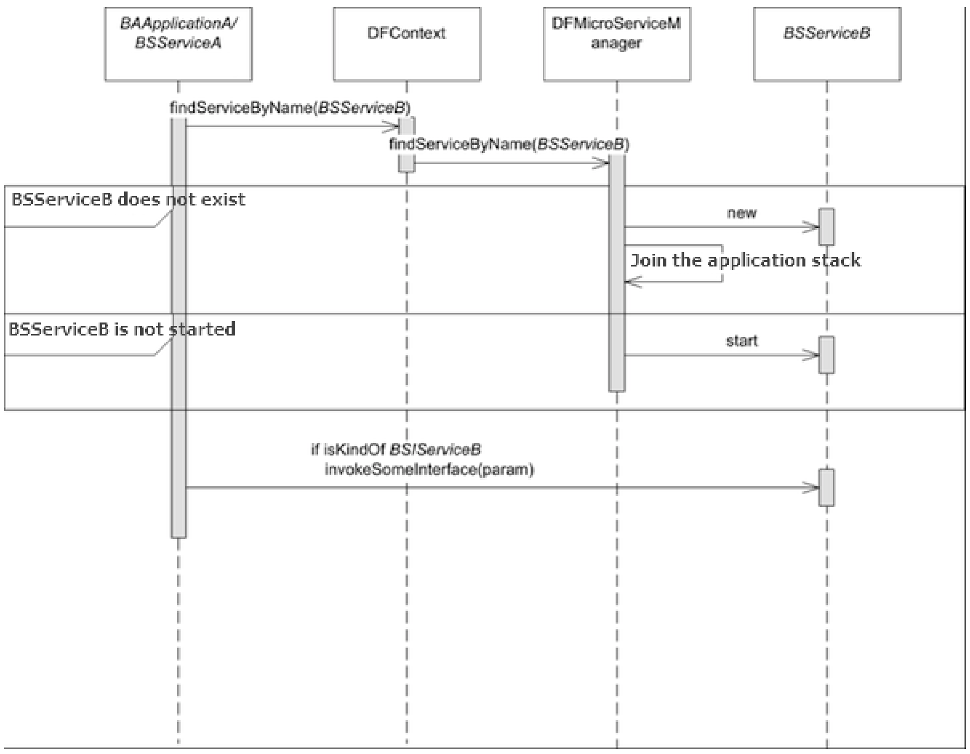

BAApplicationA/ BSServiceA
DFContext
DFMicroApplicationManager
BAApplicationB
startApplication(BAApplicationB, param)
startApplication(BAApplicationB, param)
findApplicationByName(BAApplicationB)
new
Join the application stack
PopAppAfter(BAApplicationB)
sharedDTUIAlertViewManager.removeAllObjects
startApplication(param)

Service management

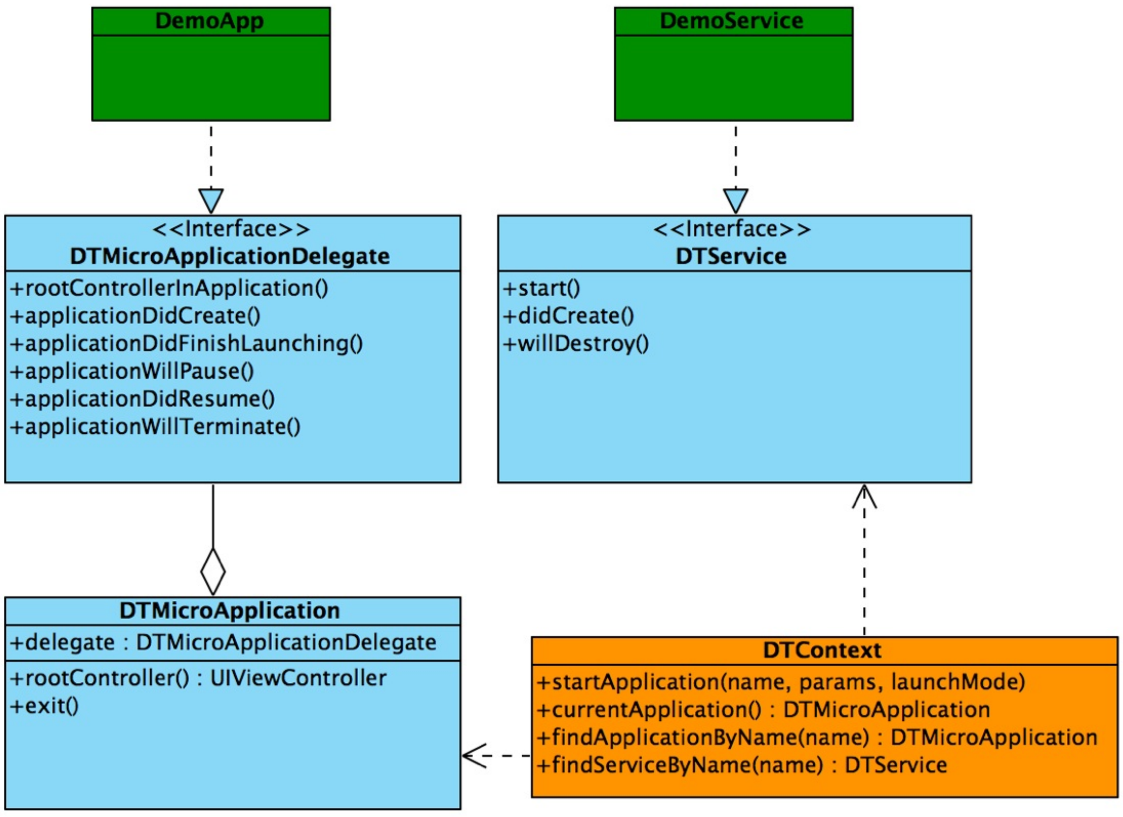
- Relevant interfaces of service management (see `DTContext.h` file for more information):

```
/**
* Find a service as per the given name.
*
* @param name: Service name
*
* @return: Return a service object if the service with given name is found, otherwise n
ull.
*/
- (id)findServiceByName:(NSString *)name;

/**
* Register a service.
*
* @param name: Service name
*/
- (BOOL)registerService:(id)service forName:(NSString *)name;

/**
* Deregister an existing service.
*
* @param name: Service name
*/
- (void)unregisterServiceForName:(NSString *)name;
```

- Service starting process:


BAApplicationA/ BSServiceA
DFContext
DFMicroServiceManager
BSServiceB
findServiceByName(BSServiceB)
findServiceByName(BSServiceB)
BSServiceB does not exist
new
Join the application stack
BSServiceB is not started
start
if isKindOf BSIServiceB invokeSomeInterface(param)

The UML class diagram illustrating how context manages micro application and service is shown below:


DemoApp
DemoService
<<Interface>>
DTMicroApplicationDelegate
+rootControllerInApplication()
+applicationDidCreate()
+applicationDidFinishLaunching()
+applicationWillPause()
+applicationDidResume()
+applicationWillTerminate()
<<Interface>>
DTService
+start()
+didCreate()
+willDestroy()
DTMicroApplication
+delegate : DTMicroApplicationDelegate
+rootController() : UIViewController
+exit()
DTContext
+startApplication(name, params, launchMode)
+currentApplication() : DTMicroApplication
+findApplicationByName(name) : DTMicroApplication
+findServiceByName(name) : DTService

4.3. mPaaS Micro Applications and Services

4.3.1. Create a micro application

In the process of developing apps based on the mPaaS iOS framework, the independent service with a UI is often configured as a micro application (such as transfer in Alipay and recharging for mobile phones), which is isolated from other services and implements its own service logic in In the process of developing applications based on the mPaaS iOS framework, the independent business with UI interface is generally set as a micro application (such as transfer in Alipay, mobile phone recharge, etc.), which is isolated from other services and implements its own service logic in the micro application. To add a micro application, you must add micro-application template code and register the micro application.

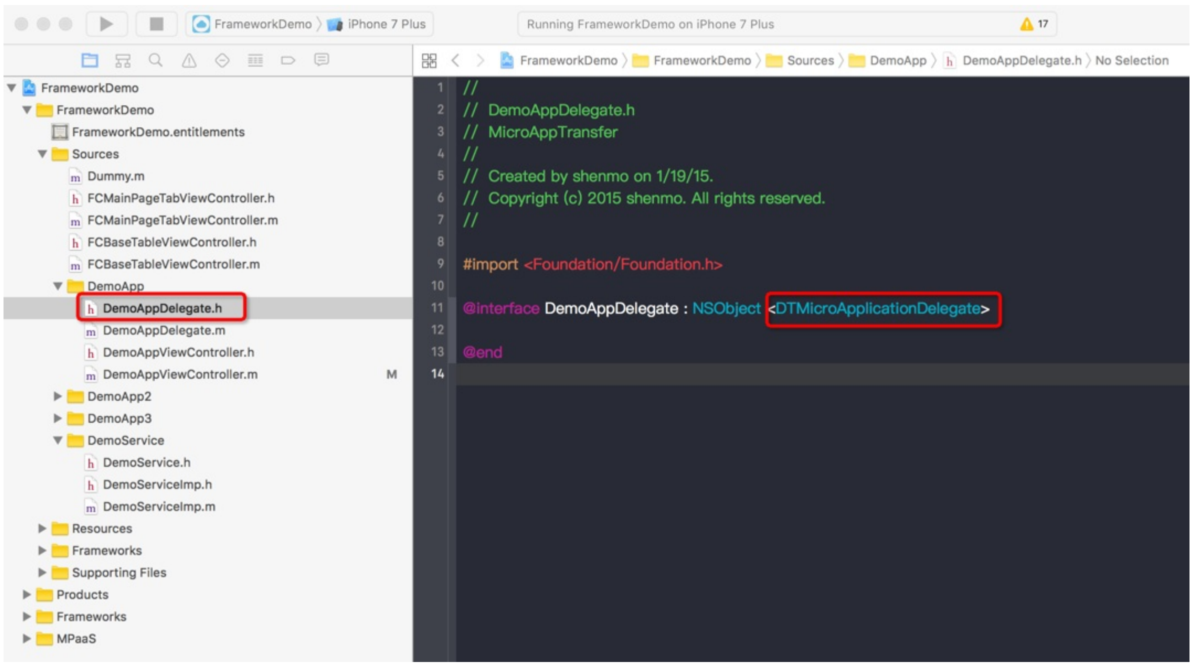
Sample code

Visit iOS framework-demo to download the sample code of the iOS mobile framework.

Procedure

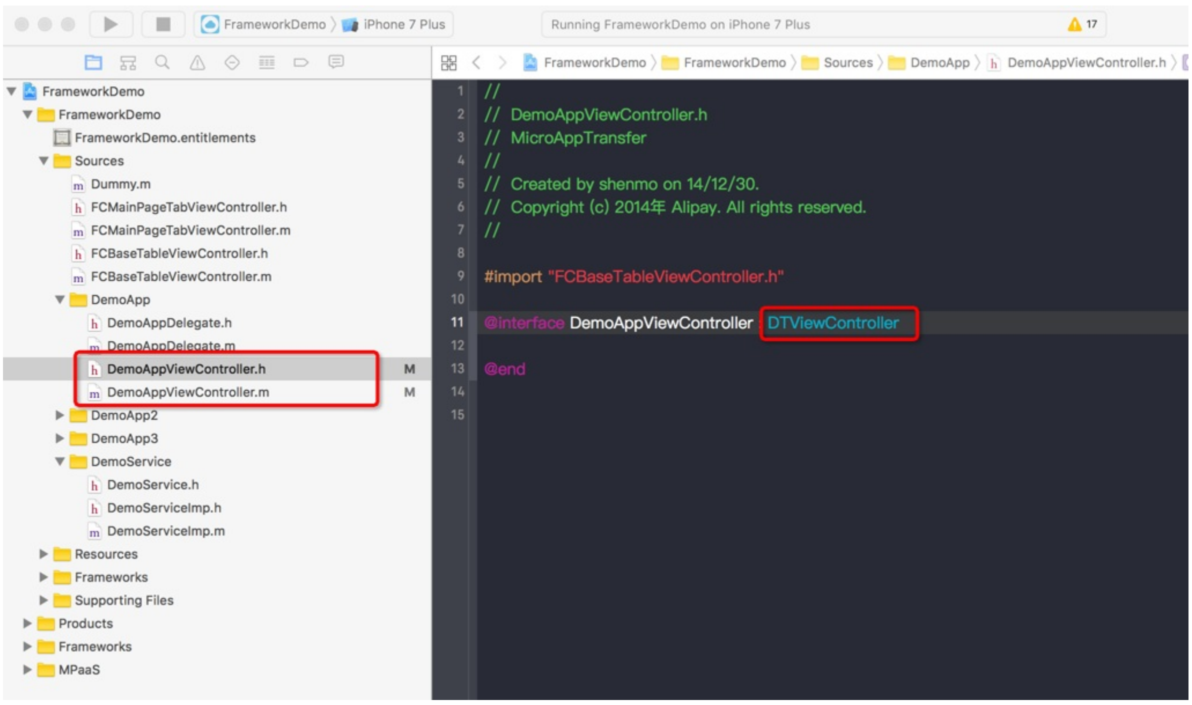
1. Add micro-application template code.

1. Create a micro-application delegation class and implement the delegation method of the micro-application manager of the mPaaS iOS framework, `DTMicroApplicationDelegate` .



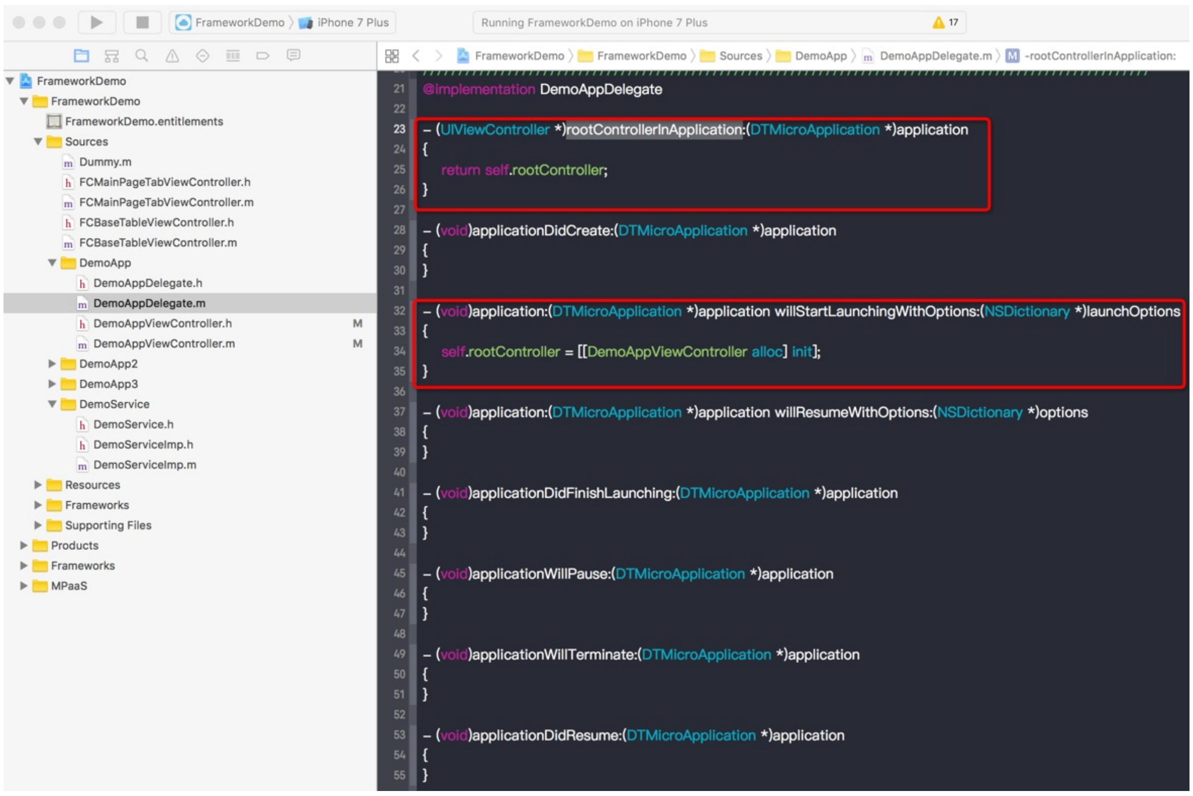
```
//
// DemoAppDelegate.h
// MicroAppTransfer
//
// Created by shenmo on 1/19/15.
// Copyright (c) 2015 shenmo. All rights reserved.
//

#import <Foundation/Foundation.h>

@interface DemoAppDelegate : NSObject <DTMicroApplicationDelegate>

@end
```

2. Create `rootViewcontroller` for the micro application, which can inherit the `DTViewController` base class provided by the mPaaS iOS framework.


FrameworkDemo
iPhone 7 Plus
Running FrameworkDemo on iPhone 7 Plus
FrameworkDemo 〉 FrameworkDemo 〉 Sources 〉 DemoApp 〉 DemoAppViewController.h
FrameworkDemo
FrameworkDemo
FrameworkDemo.entitlements
Sources
Dummy.m
FCMainPageTabViewController.h
FCMainPageTabViewController.m
FCBaseTableViewController.h
FCBaseTableViewController.m
DemoApp
DemoAppDelegate.h
DemoAppDelegate.m
DemoAppViewController.h M
DemoAppViewController.m M
DemoApp2
DemoApp3
DemoService
DemoService.h
DemoServiceImp.h
DemoServiceImp.m
Resources
Frameworks
Supporting Files
Products
Frameworks
MPaaS

```
//
//  DemoAppViewController.h
//  MicroAppTransfer
//
//  Created by shenmo on 14/12/30.
//  Copyright (c) 2014年 Alipay. All rights reserved.
//

#import "FCBaseTableViewController.h"

@interface DemoAppViewController DTViewController

@end
```

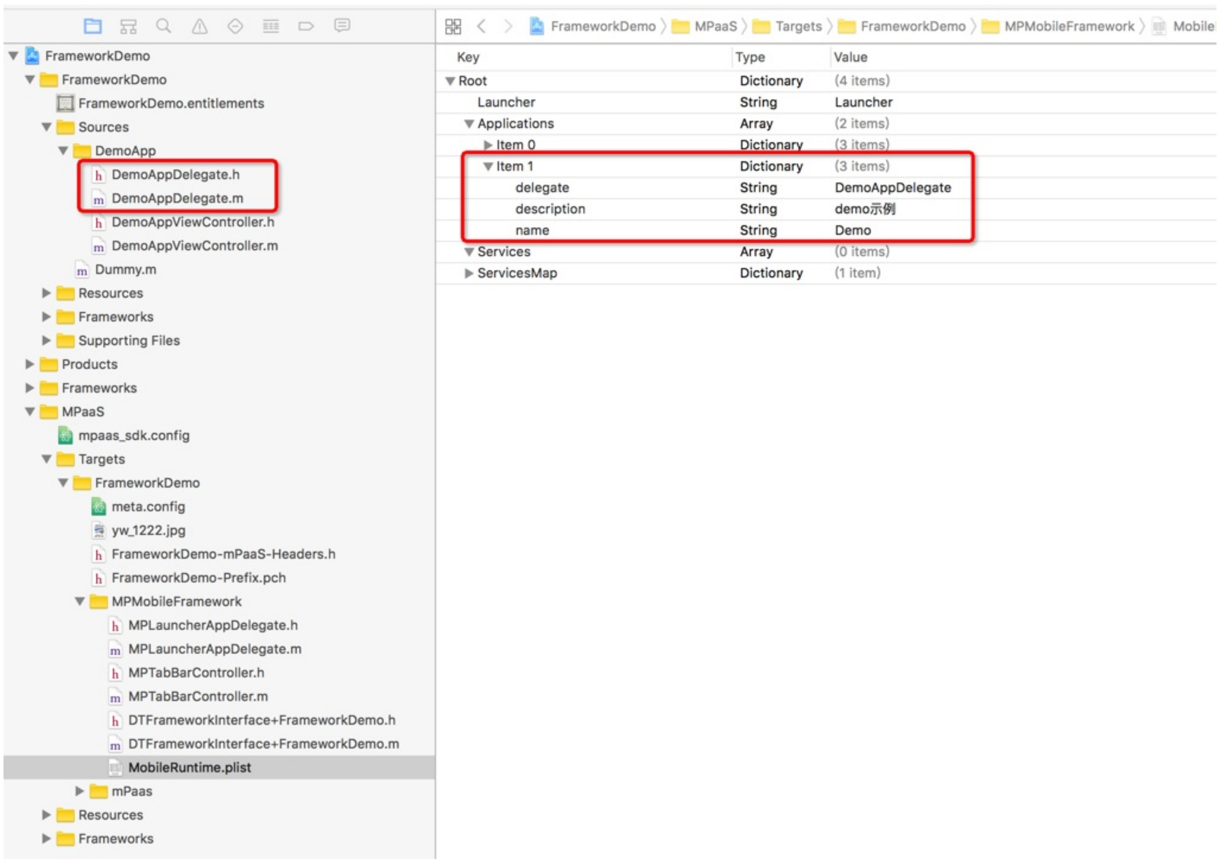
3. Specify `rootViewcontroller` for the micro application. You can perform service actions in the lifecycle of the micro application by using its delegation method.


FrameworkDemo
iPhone 7 Plus
Running FrameworkDemo on iPhone 7 Plus
FrameworkDemo 〉 FrameworkDemo 〉 Sources 〉 DemoApp 〉 DemoAppDelegate.m 〉 -rootControllerInApplication:
FrameworkDemo
FrameworkDemo
FrameworkDemo.entitlements
Sources
Dummy.m
FCMainPageTabViewController.h
FCMainPageTabViewController.m
FCBaseTableViewController.h
FCBaseTableViewController.m
DemoApp
DemoAppDelegate.h
DemoAppDelegate.m
DemoAppViewController.h M
DemoAppViewController.m M
DemoApp2
DemoApp3
DemoService
DemoService.h
DemoServiceImp.h
DemoServiceImp.m
Resources
Frameworks
Supporting Files
Products
Frameworks
MPaaS

```
@implementation DemoAppDelegate

- (UIViewController *)rootControllerInApplication:(DTMicroApplication *)application
{
    return self.rootController;
}

- (void)applicationDidCreate:(DTMicroApplication *)application
{
}

- (void)application:(DTMicroApplication *)application willStartLaunchingWithOptions:(NSDictionary *)launchOptions
{
    self.rootController = [[DemoAppViewController alloc] init];
}

- (void)application:(DTMicroApplication *)application willResumeWithOptions:(NSDictionary *)options
{
}

- (void)applicationDidFinishLaunching:(DTMicroApplication *)application
{
}

- (void)applicationWillPause:(DTMicroApplication *)application
{
}

- (void)applicationWillTerminate:(DTMicroApplication *)application
{
}

- (void)applicationDidResume:(DTMicroApplication *)application
{
}
```

2. Register the micro application.

You can manage the created micro application with the framework only after registering the micro application in `MobileRuntime.plist` .



```
▼ FrameworkDemo
  ▼ FrameworkDemo
      FrameworkDemo.entitlements
    ▼ Sources
      ▼ DemoApp
          DemoAppDelegate.h
          DemoAppDelegate.m
          DemoAppViewController.h
          DemoAppViewController.m
        Dummy.m
    ▶ Resources
    ▶ Frameworks
    ▶ Supporting Files
  ▶ Products
  ▶ Frameworks
  ▼ MPaaS
      mpaas_sdk.config
    ▼ Targets
      ▼ FrameworkDemo
          meta.config
          yw_1222.jpg
          FrameworkDemo-mPaaS-Headers.h
          FrameworkDemo-Prefix.pch
        ▼ MPMobileFramework
            MPLauncherAppDelegate.h
            MPLauncherAppDelegate.m
            MPTabBarController.h
            MPTabBarController.m
            DTFrameworkInterface+FrameworkDemo.h
            DTFrameworkInterface+FrameworkDemo.m
            MobileRuntime.plist
      ▶ mPaas
    ▶ Resources
    ▶ Frameworks
```

FrameworkDemo 〉 MPaaS 〉 Targets 〉 FrameworkDemo 〉 MPMobileFramework 〉 Mobile

Key	Type	Value
▼ Root	Dictionary	(4 items)
Launcher	String	Launcher
▼ Applications	Array	(2 items)
▶ Item 0	Dictionary	(3 items)
▼ Item 1	Dictionary	(3 items)
delegate	String	DemoAppDelegate
description	String	demo示例
name	String	Demo
▼ Services	Array	(0 items)
▶ ServicesMap	Dictionary	(1 item)

Field	Description
Delegate	The class name of `DTMicroApplicationDelegate` for application implementation.
Description	The description of the application.
Name	The name of the application. The framework context finds the application by this name.

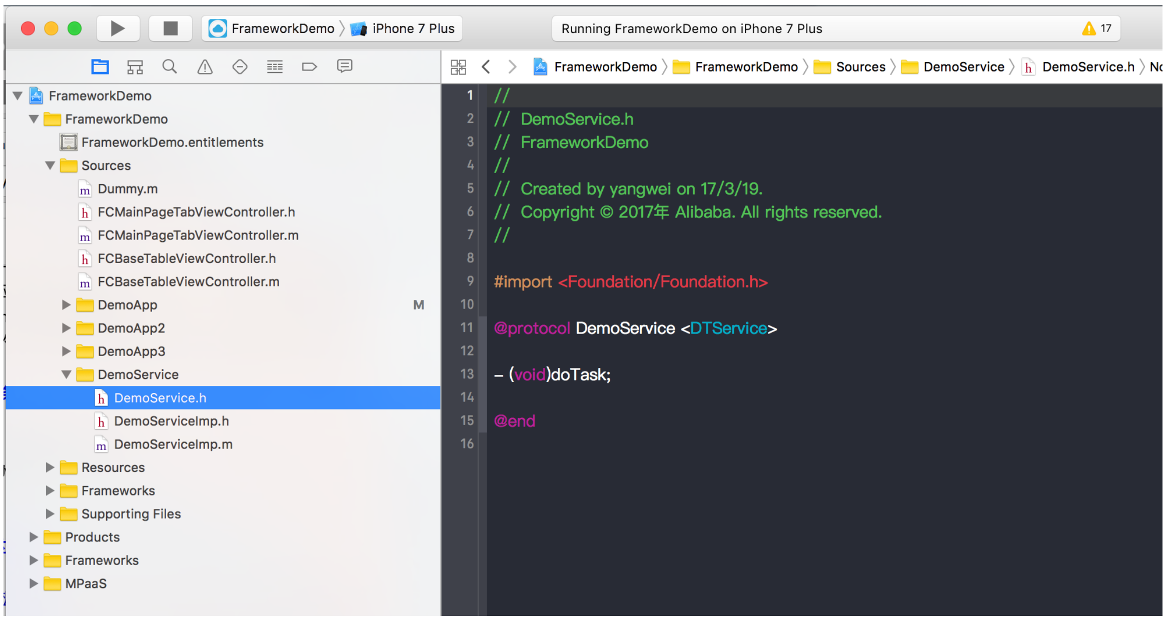
4.3.2. Create a service

In the process of developing an application based on mPaaS iOS framework, you can set the general functions without UI as a service (e.g. login) which can be easily obtained by other micro applications or services through the whole App running period. To add a service, you must add service template codes, and register a service.

Procedure

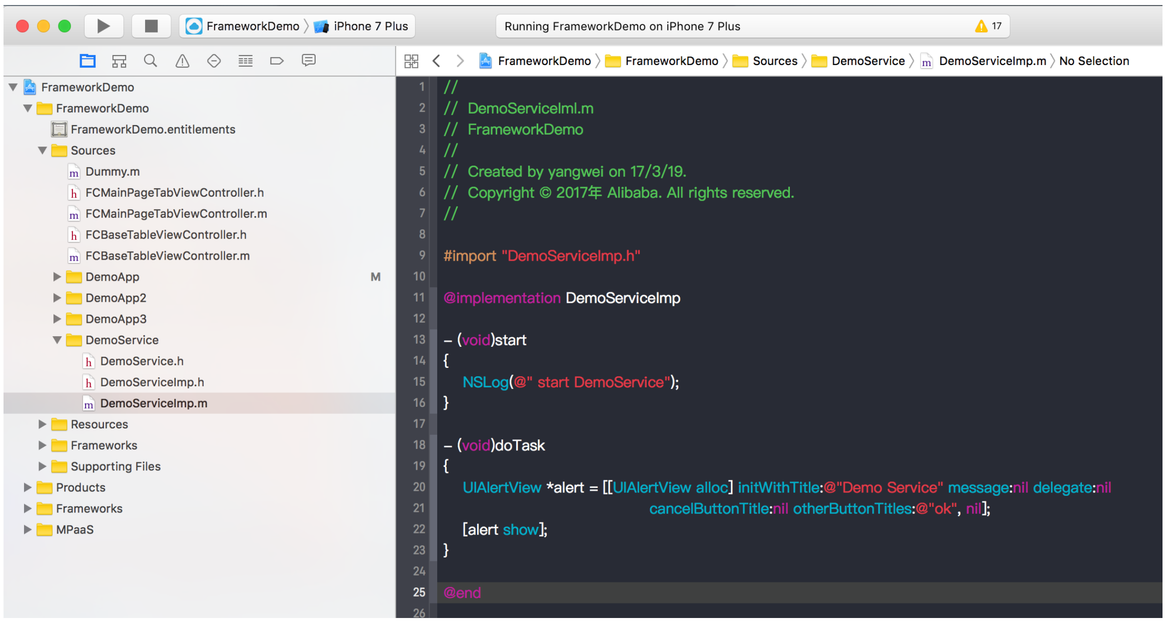
1. **Add service template codes.**

i. **Define the service’s protocol and expose the external interface method.**


FrameworkDemo 〉 iPhone 7 Plus
Running FrameworkDemo on iPhone 7 Plus
17
FrameworkDemo 〉 FrameworkDemo 〉 Sources 〉 DemoService 〉 DemoService.h 〉 No
FrameworkDemo
FrameworkDemo
FrameworkDemo.entitlements
Sources
Dummy.m
FCMainPageTabViewController.h
FCMainPageTabViewController.m
FCBaseTableViewController.h
FCBaseTableViewController.m
DemoApp
M
DemoApp2
DemoApp3
DemoService
DemoService.h
DemoServiceImp.h
DemoServiceImp.m
Resources
Frameworks
Supporting Files
Products
Frameworks
MPaaS

```
//
//  DemoService.h
//  FrameworkDemo
//
//  Created by yangwei on 17/3/19.
//  Copyright © 2017年 Alibaba. All rights reserved.
//

#import <Foundation/Foundation.h>

@protocol DemoService <DTService>

- (void)doTask;

@end
```

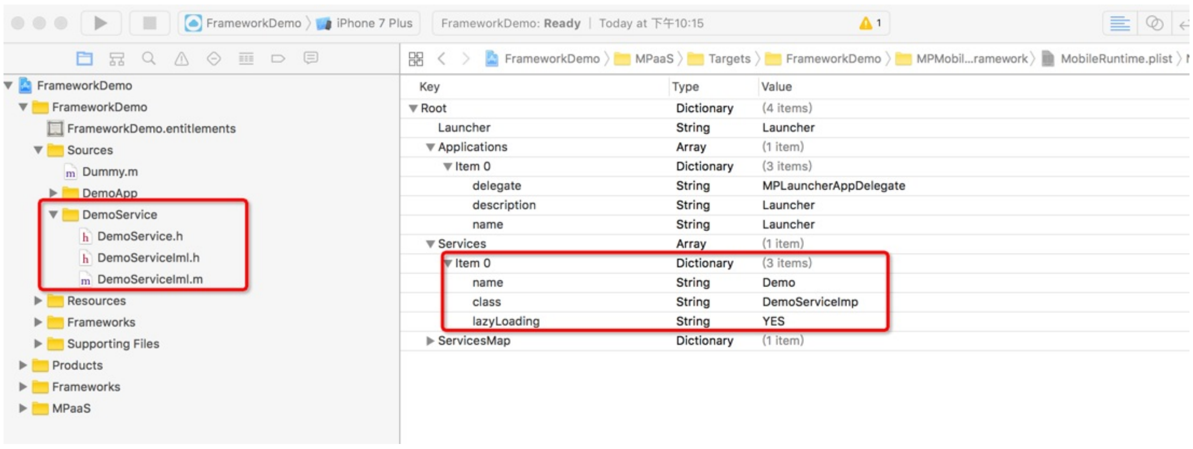
ii. Define the class to implement the service interface method.


FrameworkDemo 〉 iPhone 7 Plus
Running FrameworkDemo on iPhone 7 Plus
17
FrameworkDemo 〉 FrameworkDemo 〉 Sources 〉 DemoService 〉 DemoServiceImp.m 〉 No Selection
FrameworkDemo
FrameworkDemo
FrameworkDemo.entitlements
Sources
Dummy.m
FCMainPageTabViewController.h
FCMainPageTabViewController.m
FCBaseTableViewController.h
FCBaseTableViewController.m
DemoApp
M
DemoApp2
DemoApp3
DemoService
DemoService.h
DemoServiceImp.h
DemoServiceImp.m
Resources
Frameworks
Supporting Files
Products
Frameworks
MPaaS

```
//
//  DemoServiceIml.m
//  FrameworkDemo
//
//  Created by yangwei on 17/3/19.
//  Copyright © 2017年 Alibaba. All rights reserved.
//

#import "DemoServiceImp.h"

@implementation DemoServiceImp

- (void)start
{
    NSLog(@" start DemoService");
}

- (void)doTask
{
    UIAlertView *alert = [[UIAlertView alloc] initWithTitle:@"Demo Service" message:nil delegate:nil
                                          cancelButtonTitle:nil otherButtonTitles:@"ok", nil];
    [alert show];
}

@end
```

2. **Register a service.**

Similar to the micro application, the newly created services can be managed in a unified way via the framework only when they are registered in `MobileRuntime.plist` .



Key	Type	Value
Root	Dictionary	(4 items)
Launcher	String	Launcher
Applications	Array	(1 item)
Item 0	Dictionary	(3 items)
delegate	String	MPLauncherAppDelegate
description	String	Launcher
name	String	Launcher
Services	Array	(1 item)
Item 0	Dictionary	(3 items)
name	String	Demo
class	String	DemoServiceImp
lazyLoading	String	YES
ServicesMap	Dictionary	(1 item)

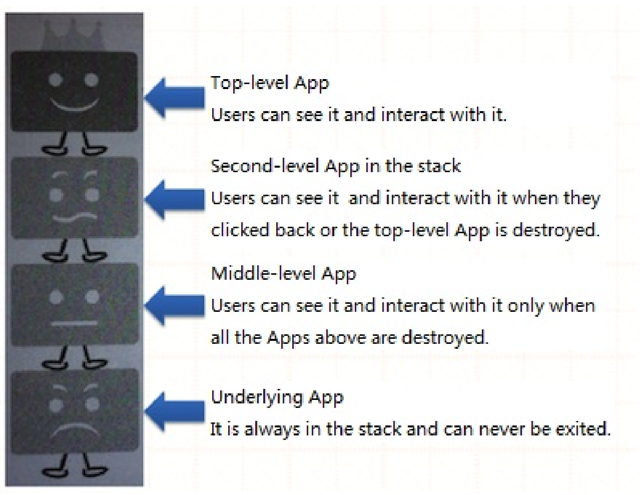
Field	Description
Name	The unique identifier of a service.
Class	The implementation class of service. When creating a service, the framework utilizes a run-time reflection mechanism to create the instances of the service implementation class.
lazyLoading	Whether to delay loading. If Yes, the service will not be instantiated when the framework starts. Only when being used can the service be instantiated and launched. If No, the service will be instantiated and launched when the framework starts. It defaults to No.

4.3.3. Manage the micro application and service

After dividing the business into micro application and service, you will not only achieve high cohesion and low coupling among modules, but also can manage micro application and service by virtue of the context provided by mPaaS iOS framework, including micro application-to-micro application, service-to-service and micro application-to-service jumping and data transmission.

Manage micro applications

Framework context manages the jumps of all micro applications in a unified way through stack, and in compliance with the following rules:


Top-level App
Users can see it and interact with it.
Second-level App in the stack
Users can see it and interact with it when they clicked back or the top-level App is destroyed.
Middle-level App
Users can see it and interact with it only when all the Apps above are destroyed.
Underlying App
It is always in the stack and can never be exited.

- Based on mPaaS iOS framework, you can quickly find a micro application by using its `name` and start another micro application in the current micro application.

```
  - (void)pushSubApp2
  {

      [DTContextGet() startApplication:@"20000002" params:@{}
launchMode:kDTMicroApplicationLaunchModePushWithAnimation];
  }
```

- The upper-level micro application in the stack can quickly jump to the root application at the bottom.

```
  - (void)exitToLauncher
  {
      //Since Launcher is at lower-level, starting Launcher means exiting from all up
per-level applications and back to Launcher
      [DTContextGet() startApplication:@"Launcher" params:nil
animated:kDTMicroApplicationLaunchModePushNoAnimation];
  }
```

- Quickly exit from the current micro application.

```
  - (void)exitSelf
  {
      [[DTContextGet() currentApplication] exitAnimated:YES];
  }
```

- Quickly exit from the started micro application.

```
  - (void)exitApp2
  {
      // If current top-level application is app3, it is workable to force app2 and i
ts windows to exit.
      [[DTContextGet() findApplicationByName:@"20000002"] forceExit];
  }
```

Manage services

- Based on mPaaS iOS framework, you can quickly start another service in the current micro application.

```
- (void)findService
{
    id<DemoService> service = [DTContextGet() findServiceByName:@"DemoService"];
    [service doTask];
}
```

4.3.4. Code sample of micro application

The Demo introduces the hierarchical relations among mPaaS micro applications. For more information about iOS framework, see mPaaS iOS framework.

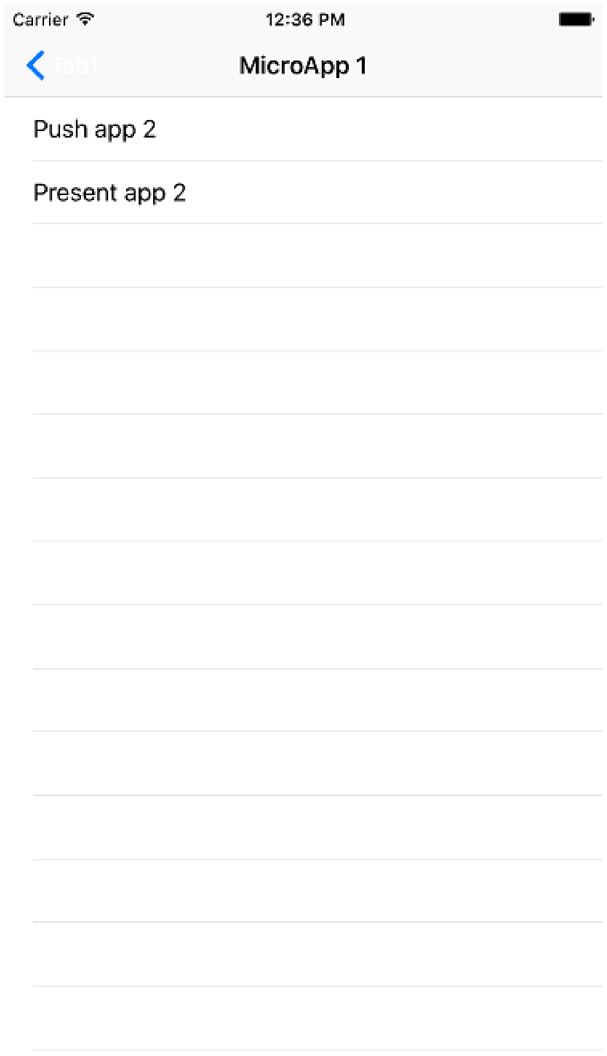
Download codes

Please refer to Get code sample and download the Demo codes locally.

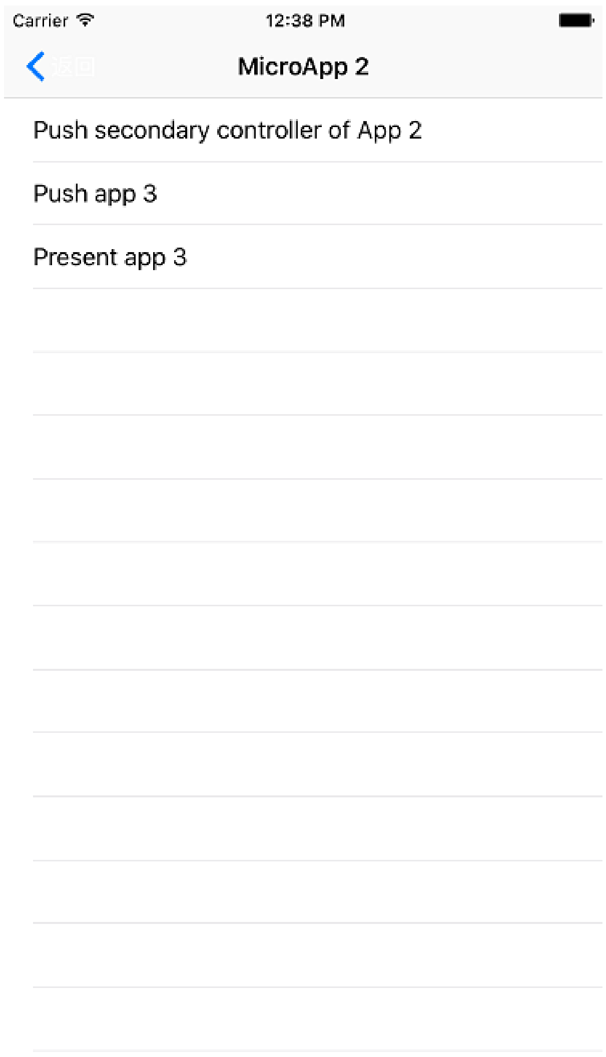
```
git clone git@git.cloud.alipay.com:mPaaS-Demos/FrameworkDemo.git
```

Micro application hierarchy demonstration

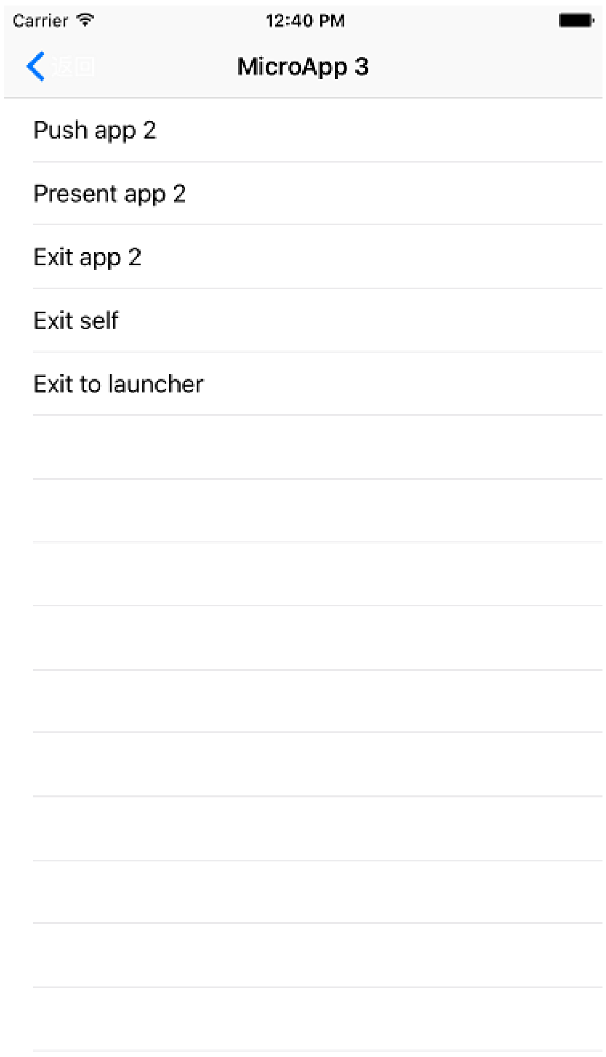
- Click **Push app** to start MicroApp 1;



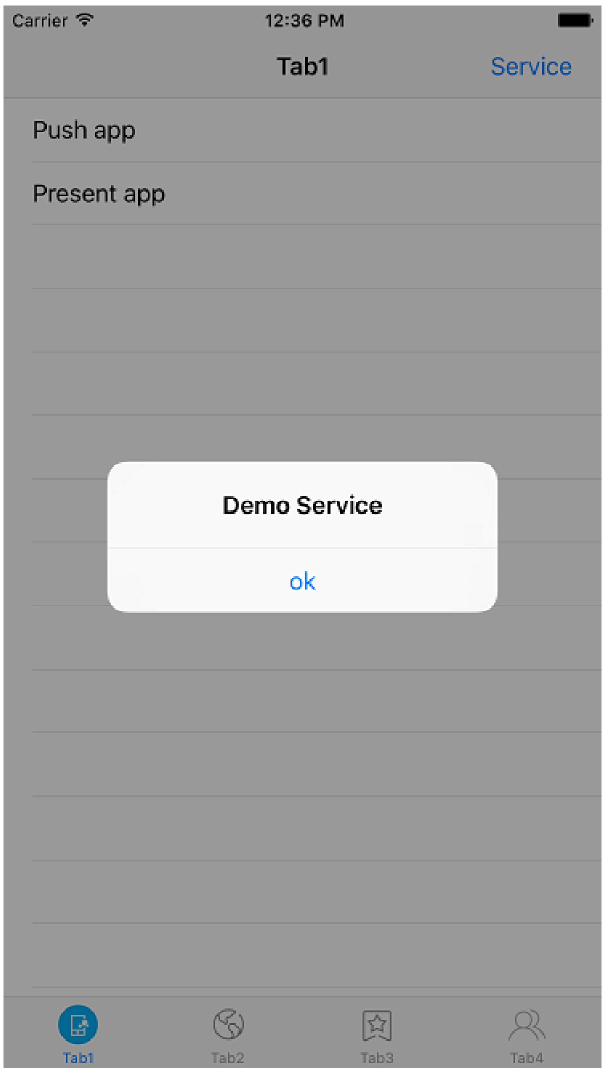
- Click **Push app 2** to start MicroApp 2;



- Click **Push app 3** to start MicroApp 3;



- If app 3 is on the top, click **Exit app 2** to force app 2 and its windows to exit;
- If app 3 is on the top, click **Exit self** to exit app 3 itself and back to app 2;
- If app 3 is on the top, click **Exit to launcher** to back to the root application and force app 1, app2, and app 3 to exit;
- Meanwhile, you can start a service in the micro application of **Launcher**.



4.4. iOS language settings

It will introduce the method of setting language in the process of integrating mPaaS into iOS client.

When integrating with an iOS project, you can configure language settings for your iOS app.

Use the system language by default

1. You can add Languages.bundle.zip to your project to configure languages supported by the current app.
2. When the app is successfully launched, initialize the multilingual framework

```
//#import <mPaas/APLanguage.h>.
[APLanguageSetting sharedSetting];
```

Obtain the current app language

You can obtain the current app language by using the following command:

```
NSString *currentLanguage = [APLanguageSetting currentLanguage].name;
```

Modify the current app language

In the `Languages.bundle` file of the project, you can view the language currently supported by the app : You can modify the current app language by using the following command:

```
[APLanguageSetting setCurrentLanguageWithName:@"en"];
```

Support multilingual copywriting

1. Add multilingual bundle files.
   i. Add the strings files corresponding to the languages currently supported by the app.
   ii. Set the path that stores the multilingual files:

   ```
   [[APLanguageBundleLoader sharedLoader] setCustomLanguagesBundlePath:@""];
   ```

2. Define text strings in strings files.

   The implementation principle of strings files is as follows:

   - The format of each text string in a strings file is as follows: The left side of the equal sign is the key of a text string while the expression on the right side is the content to be displayed in the corresponding language.

     For example : `"BeeCityPicker : City Choice" = “City Choice”` .

   - For the same text string, its key must be the same in all strings file. We recommend that you use a combination of the bundle name and the text string in Chinese as the key.

     For example : `"BeeCityPicker : City Choice"` .

3. Configure the text strings.

   For text strings that need to be provided in multiple languages, do not use hardcoded expressions. You can use the `__Text` macro. For example:

   ```
   self.navigationItem.title = __TEXT(@"BeeCityPicker",@"BeeCityPicker:City Selection",
   @"City Selection");
   ```

   - `@"BeeCityPicker"` : The `bundle` name of a text string in a strings file. Generally, it is the name of a module resource bundle.
   - `@"BeeCityPicker:City selection"` : The key of a text string in a strings file.
   - `@"City selection"` : The content to be returned by default when the text string corresponding to a specified key cannot be found in the strings files.

4.5. Customize the city selection

This article introduces the method of user-defined city selection in the process of integrating mPaaS into iOS client.

When integrating with an iOS project, you can customize the city selection.

> **Note**
>
> This function is valid only in the baseline versions 10.1.68.27 and later.

Customize the city file

All cities

1. Create a city file with an extension of `.txt`. The file content format is as follows:
   - Field 1: adcode.
   - Field 2: City name.
   - Field 3: City name in Chinese Pinyin. This field is used to configure the first letter on the right.
2. Set the path that stores the custom city file. The custom city file is saved under the path of the bundle file, for example, `BeeCityPicker.bundle/citiesWithCounty.text`. The SDK will automatically read the file name:

```
[BeeCityPickerAdapter sharedInstance].customHotCityTextFile =
@"BeeCityPicker.bundle/citiesWithCounty.text";
```

Popular cities

1. Create a popular city file. The file content is same as the city file created in All cities.
2. Set the path that stores the custom popular city file.

```
[BeeCityPickerAdapter sharedInstance].customHotCityTextFile =
@"BeeCityPicker.bundle/hotCities.text";
```

Customize cities in a mini program

For details about how to customize cities in a mini program, see Select cities.

5.Adaption to iOS

5.1. Upgrade guide of mPaaS 10.1.68

mPaaS 10.1.68 release notes

1. Starting from the 10.1.68 baseline, UIWebView has been officially discarded, and only WKWebView is supported. For details, see mPaaS is adapted to WKWebView. App Store will no longer accept new apps that use UIWebView from April 2020, and will no longer accept updates to apps that use UIWebview from December 2020. Upgrade to the 10.1.68 baseline as soon as possible to adapt to WKWebView.
2. Xcode 11 is supported to build static library packages and is fully compatible with Xcode 11 development.

mPaaS 10.1.68 upgrade instructions

Use CocoaPods for upgrade

Prerequisites

The CocoaPods mPaaS plug-in has been installed.

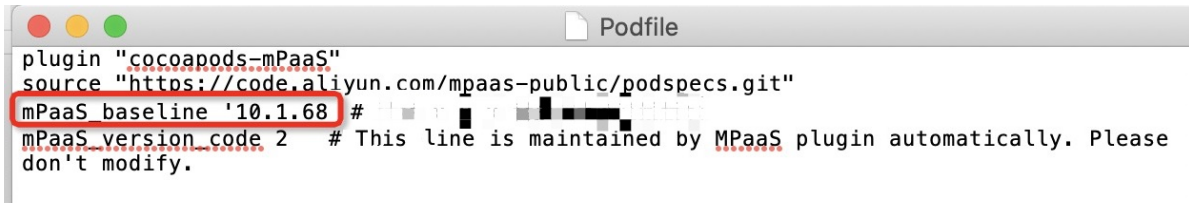
- If you have not installed the CocoaPods mPaaS plug-in, execute the following script on the terminal to install the plug-in.

```
 sh <(curl -s http://mpaas-ios.oss-cn-
hangzhou.aliyuncs.com/cocoapods/installmPaaSCocoaPodsPlugin.sh)
```

- If you have installed the CocoaPods mPaaS plug-in, directly run the upgrade command `pod mpaas update --all` to upgrade the plug-in. For details about using the CocoaPods mPaaS plug-in, see Use CocoaPods for access based on the native framework.

Procedure

1. Change the SDK version to **10.1.68** in Podfile.



```
plugin "cocoapods-mPaaS"
source "https://code.aliyun.com/mpaas-public/podspecs.git"
mPaaS_baseline '10.1.68' # [redacted]
mPaaS_version_code 2   # This line is maintained by MPaaS plugin automatically. Please
don't modify.
```

2. Run the command `pod mpaas update 10.1.68` to install the latest SDK of version **10.1.68** for the baseline.
3. Run the `pod install` or `pod update` command as needed to upgrade the SDK to version 10.1.68 in the project.

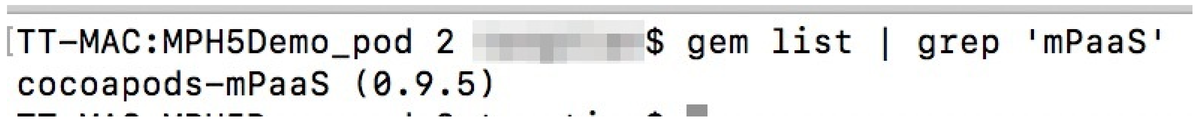
Follow-up steps

If you encounter the following error when accessing CocoaPods:

```
Invalid `Podfile` file: [!] No mPaaS_Nebula : 10.1.68 found !!! Check name & version in
Podfile.
```

Try this solution:

1. Run the command `gem list | grep 'mPaaS'` to view the CocoaPods plug-in version, as shown in the following figure.



```
[TT-MAC:MPH5Demo_pod 2 [redacted]$ gem list | grep 'mPaaS'
cocoapods-mPaaS (0.9.5)
```

2. If the CocoaPods plug-in version is earlier than 0.9.5, execute the following script to reinstall the plug-in.

```
sh <(curl -s http://mpaas-ios.oss-cn-
hangzhou.aliyuncs.com/cocoapods/installmPaaSCocoaPodsPlugin.sh)
```

Component usage and upgrade instructions

If your current baseline version is earlier than 10.1.60 and integrates the HTML5 container and mini program components, read the following instructions in detail.

- Read HTML5 container upgrade guide for Version 10.1.60 for details about upgrading HTML5 containers and offline packages.
- Read Upgrade guide for mini program Version 10.1.60 for details about upgrading applets.

Component API changes

Starting from the 10.1.32 baseline, the mPaaS component adds an adaptation layer. If your baseline is not using adaptation-layer APIs, read mPaaS 10.1.32 is adapted to iOS 13 first.

We recommend that you use the APIs of the adaptation layer after upgrading the SDK. For details, see the following upgrade instructions for different components:

- Mobile Gateway Service
- Configure project
- HTML5 Offline Packages
- Mobile Sync Service
- Client diagnosis
- Publishing Management

> **Note**
>
> We strongly recommend that you modify the code and use middle-layer (adapter) methods instead of directly using underlying methods, because certain underlying methods may be modified or discarded in future versions. You may need to take lots of time adapting them in future updates if you continue to use them.

Handle custom libraries

The components of the 10.1.68 baseline incorporate customization requirements, However, if you included custom libraries in your dependencies and upgraded the SDK from an earlier version (such as 10.1.32) to version 10.1.68, you may need to customize the custom libraries again based on the new version for security reasons. To do this, search for the group number 41708565 with DingTalk to join DingTalk group to ask.

The sharing component

Third-party SDKs in the sharing component of version 10.1.68 has been upgraded, including the WeChat, Weibo, and QQ connection SDKs. Since the sharing of WeChat and QQ added the Universal Link feature in the latest version, be sure to adapt to the new SDKs, including:

1. The application configuration information of the corresponding platform, which can be viewed in app management (under the third-party developer account), is updated. For the specific adaptation method, visit the reference link.
2. For WeChat sharing, the "universalLink" field must be added to the configuration information of the mPaaS sharing component. The value of this field is the actual Universal Link address.

5.2. Privacy permission

Background

The regulatory authority requires that the app cannot call sensitive relevant APIs before the user clicks the “Agree” button in the privacy agreement window. In order to meet this regulatory requirement, the baseline for mPaaS iOS 10.1.60.27 and later (60-series versions) and 10.1.32.18 and later (32-series versions) support this feature. You can modify your project as needed by referring to this document.

Usage

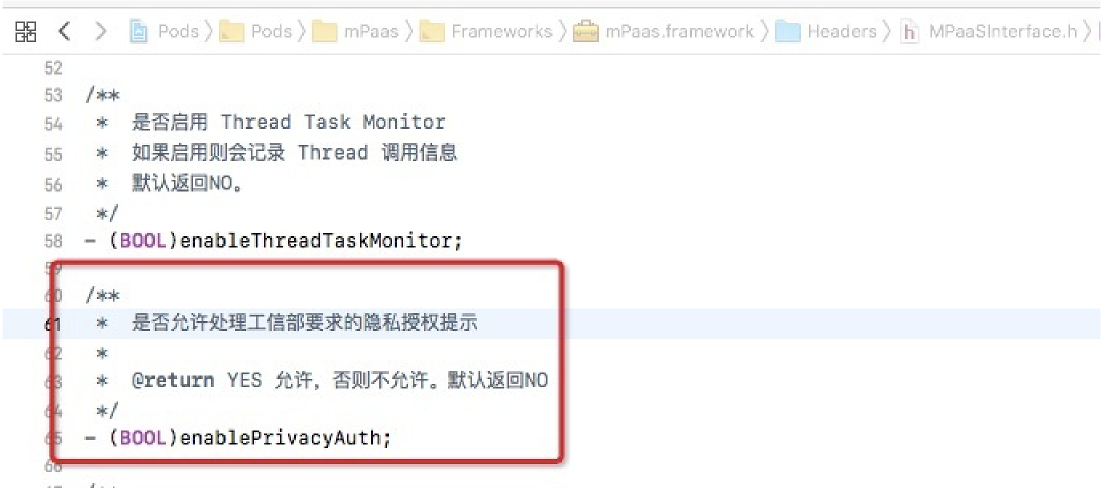
Different usage methods are required depending on whether the mPaaS iOS framework is allowed to host the lifecycle of the app. By checking whether `DFApplication` and `DFClientDelegate` are enabled for the framework in the `main.m` file of the project, you can determine whether the mPaaS iOS framework is allowed to host the lifecycle of the app. If `DFApplication` and `DFClientDelegate` are enabled, the hosting is allowed.

```
return UIApplicationMain(argc, argv, @"DFApplication", @"DFClientDelegate"); // NOW USE MPAAS FRAMEWORK
```

Host the lifecycle of the app by the framework

1. Allow privacy pop-up prompts.

In `MPaaSInterface category` , rewrite the `enablePrivacyAuth` API method and return `YES` .


Pods 〉 Pods 〉 mPaas 〉 Frameworks 〉 mPaas.framework 〉 Headers 〉 MPaaSInterface.h 〉

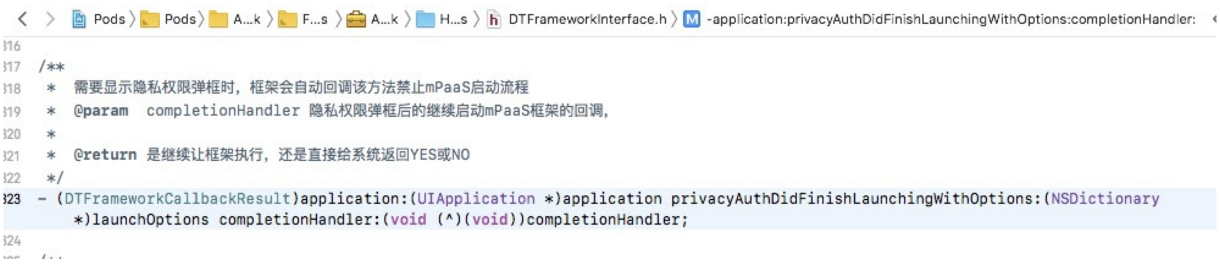
```
/**
 * 是否启用 Thread Task Monitor
 * 如果启用则会记录 Thread 调用信息
 * 默认返回NO。
 */
- (BOOL)enableThreadTaskMonitor;
/**
 * 是否允许处理工信部要求的隐私授权提示
 *
 * @return YES 允许，否则不允许。默认返回NO
 */
- (BOOL)enablePrivacyAuth;
```

~~~~
**Sample code**

```objectivec
@implementation MPaaSInterface (Portal)

- (BOOL)enablePrivacyAuth
{
return YES;
}

@end
```
~~~~

2. Implement permission pop-up windows.

Rewrite the `- (DTFrameworkCallbackResult)application:(UIApplication *)application privacyAuthDidFinishLaunchingWithOptions:(NSDictionary *)launchOptions completionHandler:(**void** (^)(**void**))completionHandler;` method provided by the framework.



Pods 〉 Pods 〉 A...k 〉 F...s 〉 A...k 〉 H...s 〉 DTFrameworkInterface.h 〉 -application:privacyAuthDidFinishLaunchingWithOptions:completionHandler:

```objectivec
/**
 *  需要显示隐私权限弹框时，框架会自动回调该方法禁止mPaaS启动流程
 *  @param  completionHandler 隐私权限弹框后的继续启动mPaaS框架的回调,
 *
 *  @return 是继续让框架执行，还是直接给系统返回YES或NO
 */
- (DTFrameworkCallbackResult)application:(UIApplication *)application privacyAuthDidFinishLaunchingWithOptions:(NSDictionary
    *)launchOptions completionHandler:(void (^)(void))completionHandler;
```

Sample code

~~~~
```objectivec
- (DTFrameworkCallbackResult)application:(UIApplication *)application
privacyAuthDidFinishLaunchingWithOptions:(NSDictionary *)launchOptions
completionHandler:(void (^)(void))completionHandler
{
UIWindow *authWindow = [[UIWindow alloc] initWithFrame:[[UIScreen mainScreen] bounds]];
authWindow.backgroundColor = [UIColor redColor];
authWindow.windowLevel = UIWindowLevelStatusBar+5;
AuthViewController *vc = [[AuthViewController alloc] init];
vc.completionHandler = completionHandler;
vc.window = authWindow;
authWindow.rootViewController = vc;
[authWindow makeKeyAndVisible];

return DTFrameworkCallbackResultContinue;
}
```
~~~~

3. Start the mPaaS framework.

After the user clicks **Agree** for authorization, call back `completionHandler` to continue to start the mPaaS framework. The sample code is as follows:

```
#import <UIKit/UIKit.h>

NS_ASSUME_NONNULL_BEGIN

@interface AuthViewController : UIViewController

@property (nonatomic, copy) void (^completionHandler)(void);
@property (nonatomic, strong) UIWindow *window;

@end

NS_ASSUME_NONNULL_END
```

```
#import "AuthViewController.h"

@interface AuthViewController ()<UIAlertViewDelegate>

@end

@implementation AuthViewController

- (void)viewDidLoad {
    [super viewDidLoad];
    // Do any additional setup after loading the view.

    [self showAlertWithTitle:@"Privacy permissions"];
}

- (void)showAlertWithTitle:(NSString *)title
{
    if ([title length] > 0) {
        UIAlertView *alert = [[UIAlertView alloc] initWithTitle:title
                                                        message:nil
                                                       delegate:self
                                              cancelButtonTitle:@"Cancel"
                                              otherButtonTitles:@"OK", nil];
        [self.window makeKeyWindow];
        [alert show];
    }
}

- (void)alertView:(UIAlertView *)alertView clickedButtonAtIndex:(NSInteger)buttonIndex
{
    if (buttonIndex == 1) {
        if (self.completionHandler) {
            self.completionHandler();
            self.window.rootViewController = nil;
            self.window = nil;
        }
    }else {
        exit(0);
    }
}



@end
```

4. Manually initialize container Context.

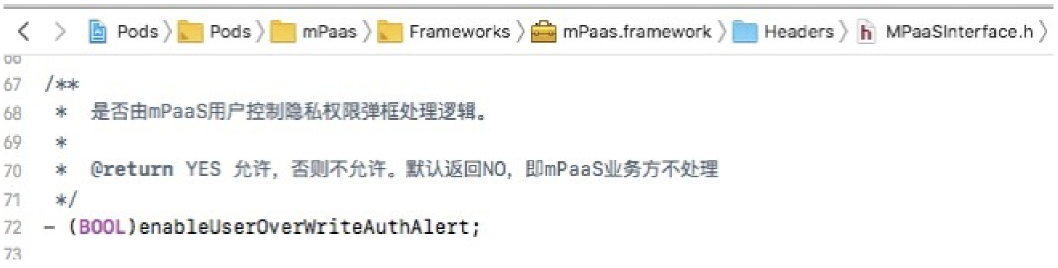
If you have integrated the HTML5 container, offline package, and mini program components, you must manually initialize container `Context` in the `- (void)application:(UIApplication *)application afterDidFinishLaunchingWithOptions:(NSDictionary *)launchOptions` method. The code sample is as follows:

```
- (void)application:(UIApplication *)application afterDidFinishLaunchingWithOptions:(NS
Dictionary *)launchOptions
{
  ...
  // Initialize container Context.
  [MPNebulaAdapterInterface setNBContextWhenEnablePrivacyAuth];

  ...
}
```

Host the lifecycle of the app not by the framework

1. Support privacy pop-up windows.

In `MPaaSInterface category`, rewrite the `enableUserOverWriteAuthAlert` API method and return the corresponding privacy permission status.



```
/**
 *  是否由mPaaS用户控制隐私权限弹框处理逻辑。
 *
 *  @return YES 允许，否则不允许。默认返回NO，即mPaaS业务方不处理
 */
- (BOOL)enableUserOverWriteAuthAlert;
```

Sample code

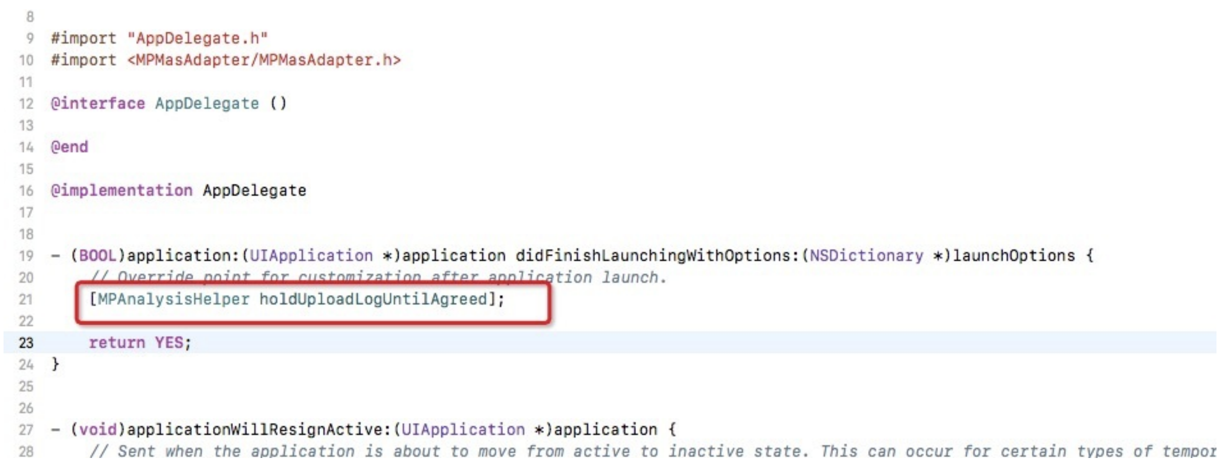
```
@implementation MPaaSInterface (mPaaSdemo)

    - (BOOL)enableUserOverWriteAuthAlert {
        // If the user has clicked "Agree" for privacy terms, "NO" is returned, which i
ndicates that mPaaS components can normally call relevant APIs.
        // Otherwise, "Yes" is returned, which indicates that mPaaS components will
hold the calls of relevant APIs.
        return ![[NSUserDefaults standardUserDefaults] boolForKey:@"xx_pr"];
    }

    @end
```

2. Prevent the early reporting of log tracking.

If you have accessed tracking-related components, you must call the `MPAnalysisHelper holdUploadLogUntilAgreed` method in the startup process to prevent the early reporting of log tracking.

Note: You can determine whether tracking-related components have been accessed by checking whether `APRemoteLogging.framework` exists.

Sample code (we recommend that you call it at the earliest possible time)



```
#import "AppDelegate.h"
#import <MPMasAdapter/MPMasAdapter.h>

@interface AppDelegate ()

@end

@implementation AppDelegate


- (BOOL)application:(UIApplication *)application didFinishLaunchingWithOptions:(NSDictionary *)launchOptions {
    // Override point for customization after application launch.
    [MPAnalysisHelper holdUploadLogUntilAgreed];

    return YES;
}


- (void)applicationWillResignActive:(UIApplication *)application {
    // Sent when the application is about to move from active to inactive state. This can occur for certain types of tempor
```

3. Manually initialize container Context.

If you have integrated the HTML5 container, offline package, and mini program components, you must manually initialize container `Context` in the `- (void)application:(UIApplication *)application afterDidFinishLaunchingWithOptions:(NSDictionary *)launchOptions` method. The code sample is as follows:

```
- (void)application:(UIApplication *)application afterDidFinishLaunchingWithOptions:(NS
Dictionary *)launchOptions
{
   ...
   // Initialize container Context.
   [MPNebulaAdapterInterface setNBContextWhenEnablePrivacyAuth];

   ...
}
```

5.3. mPaaS 10.1.60 baseline upgrade guide

About mPaaS 10.1.60

1. The 10.1.60 baseline now supports WKWebView. For details, see Version 10.1.60 is adapted to WKWebView. Since App Store will no longer accept new apps that use UIWebView from April 2020, and will no longer accept updates to apps that use UIWebview from December 2020. For details, see Apple’s official announcement. For this reason, developers need to replace UIWebView with WKWebView.
2. The 10.1.60 baseline has been adapted to iOS 13 and Xcode 11. For details, see mPaaS 10.1.60 is adapted to iOS 13.
3. The 10.1.60 baseline adds the mini program component. The official version of the mini program has a complete set of APIs, with greatly improved stability and compatibility. For mini program upgrade, see Mini program upgrade instructions. For details about the debugging, preview, and publishing functions added for the mini program IDE, see Develop mini programs.
4. The 10.1.60 baseline dramatically optimizes HTML5 containers, provides a more simplified access process, and significantly improves its compatibility and stability. For the upgrade of HTML5 containers and offline packages, see the HTML5 container upgrade guide.

5. The 10.1.60 baseline adds MCDP (Mobile Content Delivery Platform) assembly. MCDP provides the feature to personalize advertising in applications, supports personalized advertising to targeted groups, and helps APP operators reach users accurately and timely. Please read Mobile Content Delivery for more information.
6. The 10.1.60 baseline greatly improves the compatibility and stability of overall components and its functionality. For the release notes for this version, see iOS SDK release notes.
7. The 10.1.60 baseline no longer supports iOS 8.

mPaaS 10.1.60 upgrade instructions

Use CocoaPods for upgrade

Prerequisites

The CocoaPods mPaaS plug-in has been installed.

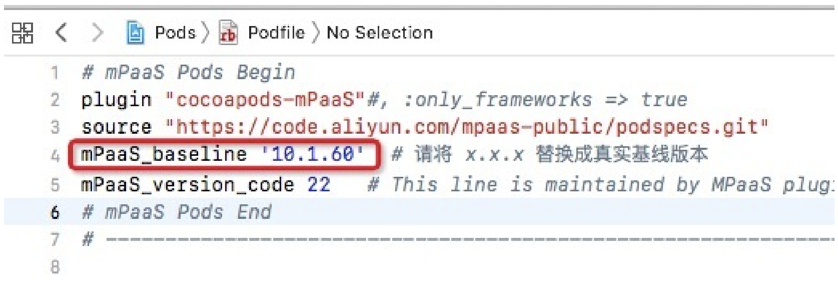
- If you have not installed the CocoaPods mPaaS plug-in, execute the following script on the terminal to install the plug-in.

```
 sh <(curl -s http://mpaas-ios.oss-cn-
hangzhou.aliyuncs.com/cocoapods/installmPaaSCocoaPodsPlugin.sh)
```

- If you have installed the CocoaPods mPaaS plug-in, directly run the upgrade command `pod mpaas update --all` to upgrade the plug-in. For details about using the CocoaPods mPaaS plug-in, see Use CocoaPods for access based on the native framework.

Procedure

1. In Podfile, change the SDK version to **10.1.60**.



```
# mPaaS Pods Begin
plugin "cocoapods-mPaaS"#, :only_frameworks => true
source "https://code.aliyun.com/mpaas-public/podspecs.git"
mPaaS_baseline '10.1.60'  # 请将 x.x.x 替换成真实基线版本
mPaaS_version_code 22   # This line is maintained by MPaaS plug
# mPaaS Pods End
# ---------------------------------------------------------------
```

2. Run the command `pod mpaas update 10.1.60` to install the latest SDK of version **10.1.60** for the baseline.
3. Run the `pod install` or `pod update` command as needed to upgrade the SDK to version 10.1.60 in the project.

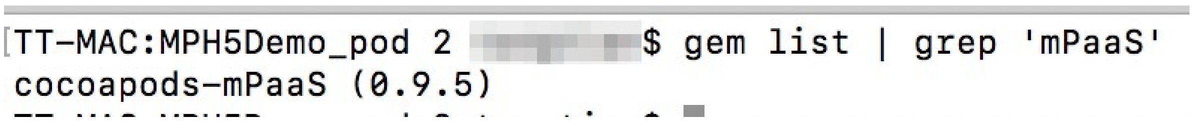
Follow-up steps

If you encounter the following error when accessing CocoaPods:

```
Invalid `Podfile` file: [!] No mPaaS_Nebula : 10.1.60-beta found !!! Check name & versi
on in Podfile.
```

Try this solution:

1. Run the command `gem list | grep 'mPaaS'` to view the CocoaPods plug-in version, as shown in the following figure.



```
[TT-MAC:MPH5Demo_pod 2 [redacted]$ gem list | grep 'mPaaS'
cocoapods-mPaaS (0.9.5)
```

2. If the CocoaPods plug-in version is earlier than 0.9.5, execute the following script to reinstall the plug-in.

```
sh <(curl -s http://mpaas-ios.oss-cn-
hangzhou.aliyuncs.com/cocoapods/installmPaaSCocoaPodsPlugin.sh)
```

Component usage and upgrade instructions

In the 10.1.60 baseline, the accessibility and usability of HTML5 container and mini program have been greatly improved. If you have used these components, read the following instructions in detail.

- Read HTML5 container upgrade guide for version 10.1.60 for details about upgrading HTML5 containers and offline packages.
- Read Upgrade guide for mini program Version 10.1.60 for details about upgrading applets.

Component API changes

Starting from the 10.1.32 baseline, the mPaaS component adds an adaptation layer. If your baseline is not using adaptation-layer APIs, read mPaaS 10.1.32 is adapted to iOS 13 first.

We recommend that you use the APIs of the adaptation layer after upgrading the SDK. For details, see the following upgrade instructions for different components:

- Mobile Gateway
- HTML5 Offline Packages
- Mobile Sync Service
- Client diagnosis
- Publishing Management

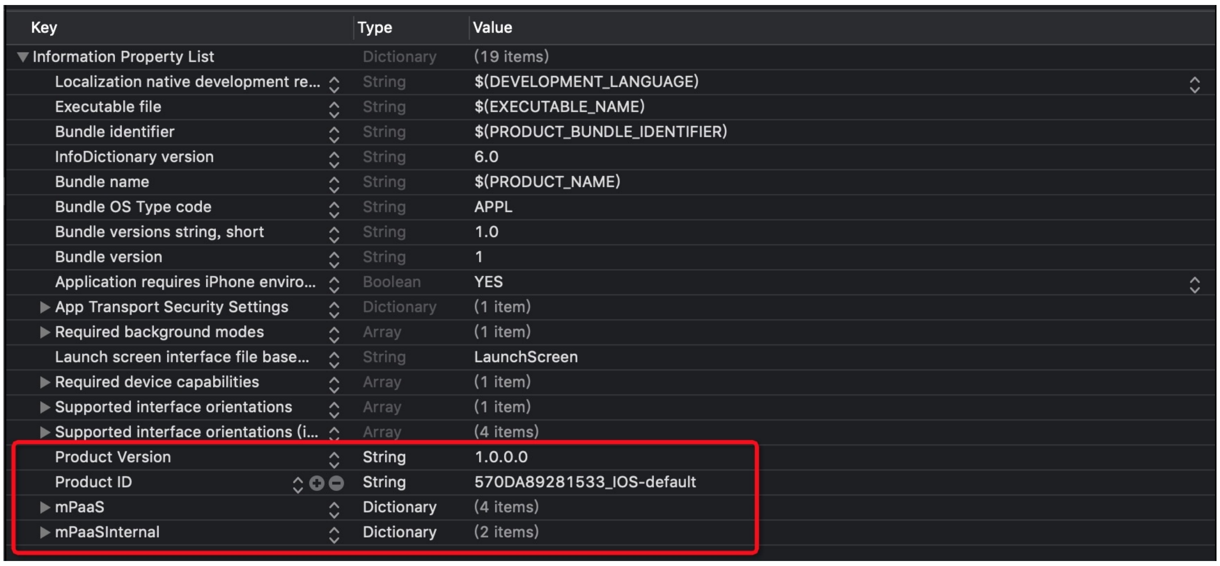
> **Note**
>
> - Pay special attention to the directory and info.plist configuration changes for mPaaS components in the project.
> - We strongly recommend that you modify the code and use middle-layer (adapter) methods instead of directly using underlying methods, because certain underlying methods may be modified or discarded in future versions. You may need to take lots of time adapting them in future updates if you continue to use them.

Change of the directory structure

Among the component category directories and files under the `MPaaS` directory of the project, only `APMobileFramework` and `mPaas` are kept after the upgrade. All the other directories, such as `MPHotpatchSDK` and `APRemoteLogging` , are automatically removed. If there are any custom files saved under these directories, you need to back up them in advance. For details of the directory structure, see mPaaS directory structure.

Change of Info.plist

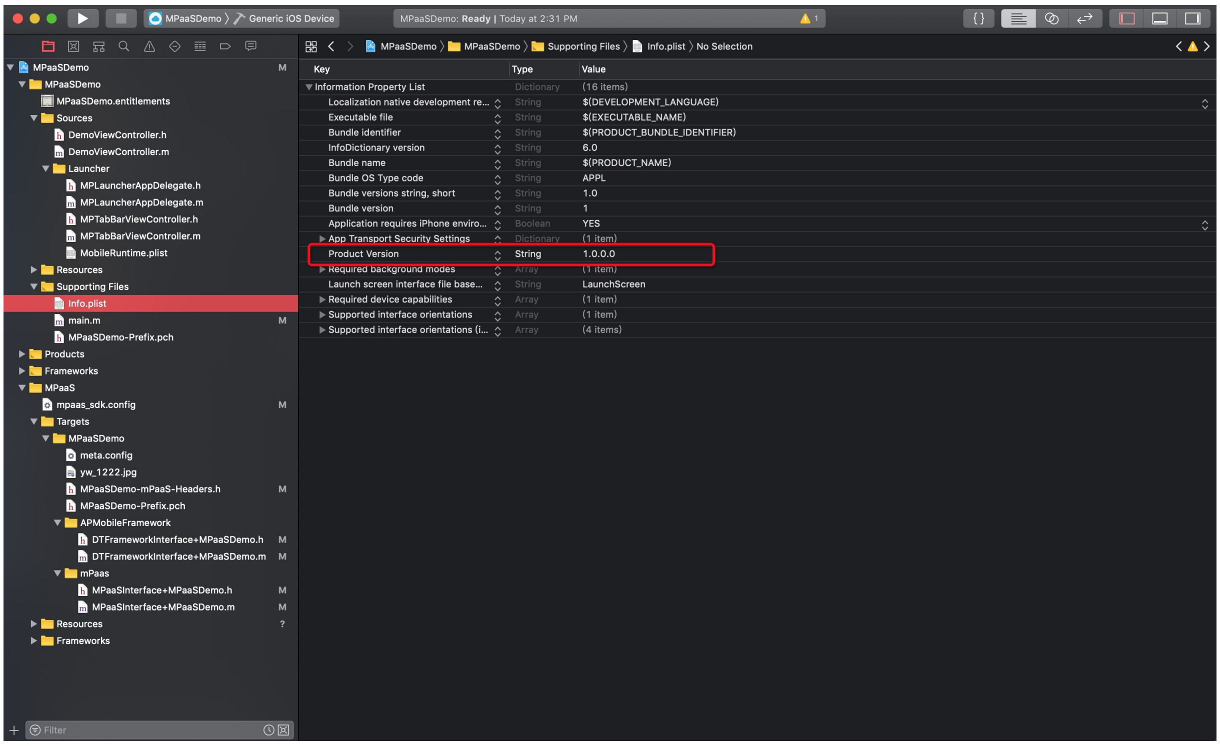
The following figure shows the related mPaaS fields inserted in the Info.plist file of the project before the upgrade.



Key	Type	Value
Information Property List	Dictionary	(19 items)
Localization native development re...	String	$(DEVELOPMENT_LANGUAGE)
Executable file	String	$(EXECUTABLE_NAME)
Bundle identifier	String	$(PRODUCT_BUNDLE_IDENTIFIER)
InfoDictionary version	String	6.0
Bundle name	String	$(PRODUCT_NAME)
Bundle OS Type code	String	APPL
Bundle versions string, short	String	1.0
Bundle version	String	1
Application requires iPhone enviro...	Boolean	YES
App Transport Security Settings	Dictionary	(1 item)
Required background modes	Array	(1 item)
Launch screen interface file base...	String	LaunchScreen
Required device capabilities	Array	(1 item)
Supported interface orientations	Array	(1 item)
Supported interface orientations (i...	Array	(4 items)
Product Version	String	1.0.0.0
Product ID	String	570DA89281533_IOS-default
mPaaS	Dictionary	(4 items)
mPaaSInternal	Dictionary	(2 items)

In 10.1.32 and later versions, only the `Product Version` field is required. After the baseline is upgraded, the plug-in automatically removes the `Product ID` , `mPaaS` , and `mPaaSInternal` fields. If the plug-in fails to remove these fields, you need to delete them manually. The following figure shows the fields after the upgrade.

Note: Do not delete the `Product Version` field when you delete the fields manually.



MPaaSDemo 〉 Generic iOS Device

MPaaSDemo: **Ready** | Today at 2:31 PM

MPaaSDemo 〉 MPaaSDemo 〉 Supporting Files 〉 Info.plist 〉 No Selection

```
▼ MPaaSDemo                                         M
  ▼ MPaaSDemo
      MPaaSDemo.entitlements
    ▼ Sources
        DemoViewController.h
        DemoViewController.m
      ▼ Launcher
          MPLauncherAppDelegate.h
          MPLauncherAppDelegate.m
          MPTabBarViewController.h
          MPTabBarViewController.m
          MobileRuntime.plist
    ▶ Resources
    ▼ Supporting Files
        Info.plist
        main.m                                      M
        MPaaSDemo-Prefix.pch
  ▶ Products
  ▶ Frameworks
  ▼ MPaaS
      mpaas_sdk.config                              M
    ▼ Targets
      ▼ MPaaSDemo
          meta.config
          yw_1222.jpg
          MPaaSDemo-mPaaS-Headers.h                 M
          MPaaSDemo-Prefix.pch
        ▼ APMobileFramework
            DTFrameworkInterface+MPaaSDemo.h        M
            DTFrameworkInterface+MPaaSDemo.m        M
        ▼ mPaas
            MPaaSInterface+MPaaSDemo.h              M
            MPaaSInterface+MPaaSDemo.m              M
    ▶ Resources                                     ?
    ▶ Frameworks
```

Key	Type	Value
Information Property List	Dictionary	(16 items)
Localization native development re...	String	$(DEVELOPMENT_LANGUAGE)
Executable file	String	$(EXECUTABLE_NAME)
Bundle identifier	String	$(PRODUCT_BUNDLE_IDENTIFIER)
InfoDictionary version	String	6.0
Bundle name	String	$(PRODUCT_NAME)
Bundle OS Type code	String	APPL
Bundle versions string, short	String	1.0
Bundle version	String	1
Application requires iPhone enviro...	Boolean	YES
App Transport Security Settings	Dictionary	(1 item)
Product Version	String	1.0.0.0
Required background modes	Array	(1 item)
Launch screen interface file base...	String	LaunchScreen
Required device capabilities	Array	(1 item)
Supported interface orientations	Array	(1 item)
Supported interface orientations (i...	Array	(4 items)

Handle custom libraries

The components of the 10.1.60 baseline incorporate customization requirements. However, if you included custom libraries in your dependencies and upgraded the SDK from an earlier version (such as 10.1.32) to version 10.1.60, you may need to customize the custom libraries again based on the new version for security reasons. To do this, submit a ticket or contact mPaaS technical support personnel for consultation.

5.4. Adapt to WKWebview

WKWebView is the new-generation built-in browser component in iOS 8 introduced by Apple. It is designed to replace the outdated UIWebView component. This component features multi-process rendering, including page scrolling without affecting image resource loading, crash protection without affecting the main process, and reduced memory usage. Compared with UIWebView, WKWebView has greatly improved its performance, stability, and user experience. After several years of iteration (from iOS 8 to iOS 9, iOS 10, iOS 11, and iOS 12), WKWebView has gradually solved all the problems that occurred in the early stage of its launch and improved its stability.

After iOS 12 was released, Apple APIs began to prompt users to gradually discard the UIWebView API. Since August 2019, when developers submit their apps with the UIWebView component to App Store for approval, they are prompted with the following warning to remind them to switch to WKWebView soon.

Additionally, Apple announced on December 23, 2019 that App Store will no longer accept new apps developed by using UIWebView from April 2020, and will no longer accept updates to existing apps developed by using UIWebview from December 2020.

In response to this situation, mPaaS has been adapted to WKWebView and supports switching from UIWebView to WKWebView. In order to ensure the stability of HTML5 pages after the switchover from UIWebView to WKWebView, the adaptation process of mPaaS to WKWebView is divided into the following two stages:

- Stage 1: Since November 2019, the mPaaS baseline supports the coexistence of UIWebView and WKWebView, and gradually switches to WKWebView through canary deployment capabilities.
- Stage 2: Since March 2020, the mPaaS baseline deletes all UIWebView-related code, and all HTML5 services are switched to WKWebView.

The mPaaS 10.1.60 baseline has completed stage 1 of adaptation. For users who integrate mPaaS HTML5 container and mini program components, they need to upgrade to the latest 10.1.60 baseline as soon as possible by observing the following instructions (Upgrade the baseline), and to switch to WKWebView (Use WKWebView).

Upgrade the baseline

Based on app release situations, users who integrate mPaaS HTML5 container and mini program components need to take actions based on the following principles and upgrade the baseline to adapt to WKWebView.

- For apps launched in App Store before April 2020: To ensure the stability of switching your existing services to WKWebView, we recommend that you upgrade to the 10.1.60 baseline to support online canary deployment and rollback. For upgrade instructions, see Instructions for upgrading to version 10.1.60.
- For new apps that are not yet launched in App Store before April 2020: Since App Store will no longer accept new apps with UIWebView after April, you must use version 10.1.68 without UIWebView-related code and be prepared for service regression testing and verification. For upgrade instructions, see Instructions for upgrading to mPaaS 10.1.68-Beta.

Use WKWebView

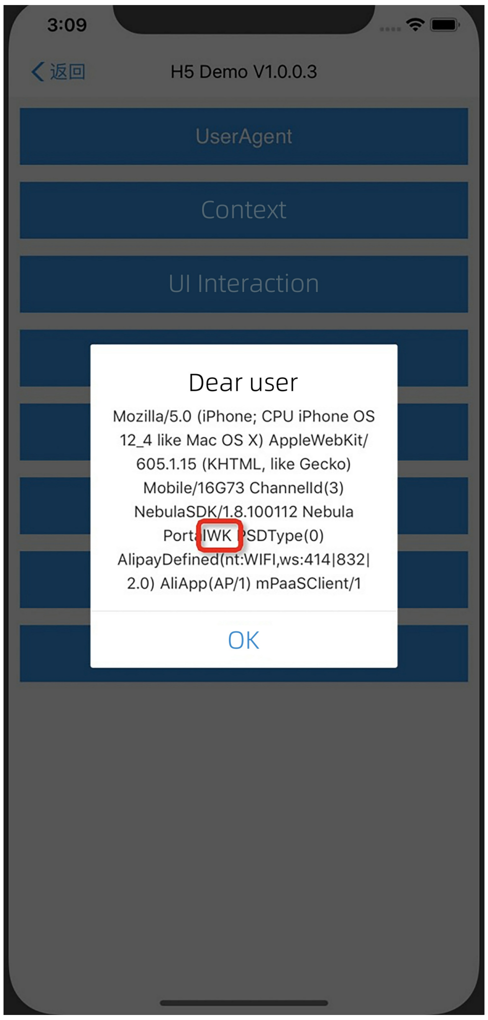
mPaaS containers use UIWebView to load HTML5 pages by default. The mPaaS framework supports two WKWebView enablement methods: **global enablement** and **canary deployment enablement**.

The 10.1.60 baseline

In the 10.1.60 baseline, UIWebView and WKWebView coexist in mPaaS containers, where UIWebView is used to load HTML5 pages by default. You can globally enable WKWebView in the following way to make all pages that are loaded by mPaaS containers use WKWebView.

```
- (void)application:(UIApplication *)application afterDidFinishLaunchingWithOptions:(NS
Dictionary *)launchOptions
{
    //...
    // Globally enable WKWebView
    [MPNebulaAdapterInterface shareInstance].nebulaUseWKArbitrary = YES;
     //...
}
```

After you enable WKWebView, you can view the UA of the current HTML5 page. If the UA contains the `WK` string shown in the following figure, this page has been successfully switched to use WKWebView.



Mozilla/5.0 (iPhone; CPU iPhone OS 12_4 like Mac OS X) AppleWebKit/605.1.15 (KHTML, like Gecko) Mobile/16G73 ChannelId(3) NebulaSDK/1.8.100112 Nebula PortalWK PSDType(0) AlipayDefined(nt:WIFI,ws:414|832|2.0) AliApp(AP/1) mPaaSClient/1

Other instructions

After WKWebView is globally enabled, in order to ensure the functional stability of online HTML5 pages, the mPaaS framework provides **online stop-loss** capabilities to help you quickly switch WKWebView to UIWebView. The procedure is as follows.

Add a configuration switch to the real-time publishing component to prevent it from using UIWebView for offline packages or URLs.

The **Key** (key) of the configuration switch is `h5_wkArbitrary` , and the **Value** (value) is as follows:

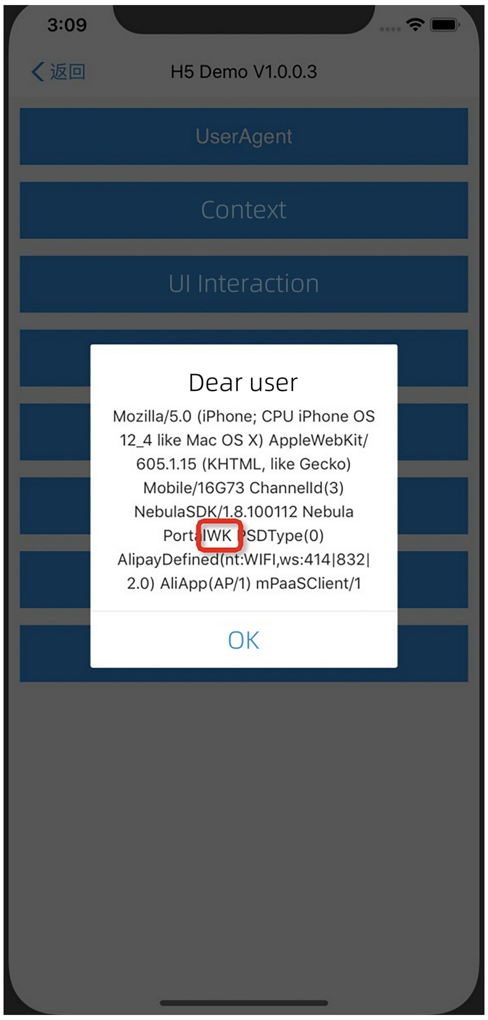
```
{
  "enable": true,
  "enableSubView": false,
  "exception": [
    {
      "appId": "^(70000000|20000193)$"
    },
    {
      "url": "https://invoice[.]starbucks[.]com[.]cn/"
    },
    {
      "url":"https://front[.]verystar[.]cn/starbucks/alipay-invoice"
    }]
}
```

The following table describes the value configuration items.

Configuration item		Description	Remarks
enable		Whether to enable WKWebView. `true` for yes and `false` for no.	The default is `false` .
enableSubView		Whether to enable WKWebView for the embedded webView in the mini program. `true` for yes and `false` for no.	The default is `false` .
exception	appId	WKWebView is not used for all HTML5 pages that match the appId regular expression in offline packages.	The default is `nil` . This field is valid only when `enable` is set to `true` .
	url	WKWebView is not used for all HTML5 pages that match the url regular expression.	

The 10.1.68-beta baseline

Containers in version 10.1.68-beta use WKWebView to load offline packages and mini programs by default. You can view the UA of the current HTML5 page. If the UA contains the `WK` string shown in the following figure, the current page has been successfully switched to use WKWebView.



Dear user

Mozilla/5.0 (iPhone; CPU iPhone OS 12_4 like Mac OS X) AppleWebKit/605.1.15 (KHTML, like Gecko) Mobile/16G73 ChannelId(3) NebulaSDK/1.8.100112 Nebula PortalWK PSDType(0) AlipayDefined(nt:WIFI,ws:414|832|2.0) AliApp(AP/1) mPaaSClient/1

5.5. mPaaS 10.1.68 baseline adapt to Xcode 13

Background

Since April.25th 2022, apps that are to be submitted to App Store must be built based on Xcode 13. For the new tool chain, the App needs to be adapted.

Status quo

mPaaS has adapted and tested for Xcode 13 in 10.1.68.47 and above version baseline.

Upgrade SDK/components

Use CocoaPods for upgrade

Follow the steps below to install the latest SDK version 10.1.68:

1. In Podfile, change the SDK version to **10.1.6**8.

2. Run the command `pod mpaas update 10.1.68`. If it prompts an error, you need to update the plug-in first through the `pod mpaas update -all` command, and then execute command `pod mpaas update 10.1.68` again.
3. Run the command `pod install`.

API changes

No API changes are required for this adaptation.

Handle custom baselines

If you are using a custom baseline, you may need to customize the baseline again based on the new version. To do this, please search for group number 41708565 with DingTalk to join DingTalk group to contact mPaaS technical support staff for consultation.

List of libraries adapted to iOS 15 updates

- The map component upgrades the default Amap to version 7.1.14.
- Share component.
- Some internal dependencies.

We recommend that you perform full regression testing in iOS 15 after you have adapted mPaaS 10.1.68 to iOS 15.

Verification scope

Since the upgrade of Apple's toolchain is a black-box operation, it often brings stability and other issues. After the app is adapted to Xcode 13, it is recommended to conduct a comprehensive regression test

5.6. mPaaS 10.1.68 baseline adapt to iOS 15

This topic describes how to adapt mPaaS with the baseline 10.1.68 to iOS 15.

Background

Apple has officially released iOS 15 in September, 2021. The apps must be adapted to new system features and APIs. Currently, mPaaS has adapted and tested for iOS 15 in the 10.1.68.38 and later baselines.

Status quo

As the basic library, mPaaS has adapted and tested for iOS 15 built using the IPA package generated by Xcode 12. If you plan to launch your apps in Apple App Store, **you must use Xcode 12 for packaging**. The tool chain for Xcode 13 is being improved. After the tool chain is improved, mPaaS will release a version adapted to iOS 15 built under Xcode 13.

Upgrade the SDK or components

Upgrade based on CocoaPods

Install the latest SDK of version **10.1.68** by performing the following steps:

1. Check that the mPaaS version is **10.1.68** in Podfile.
2. Run the `pod mpaas update 10.1.68` command. If an error is returned, run the `pod mpaas update --all` command to update the plug-in and then rerun the command.

3. Run the `pod install` command.

API changes

No API changes are required for this adaptation.

Handle custom baselines

If you are using a custom baseline, you may need to customize the baseline again based on the new version. To do this, search for group number 41708565 with DingTalk to join DingTalk group to contact mPaaS technical support staff for consultation.

List of libraries adapted to iOS 15 updates

- Mini program
- HTML5 container
- Some internally dependent components

We recommend that you perform full regression testing in iOS 15 after you have adapted mPaaS 10.1.68 to iOS 15.

5.7. mPaaS 10.1.68 baseline adapt to iOS 14

Background

Apple officially released iOS 14 on September 17, 2020. App must be adapted to new system features and APIs. Currently, mPaaS with the baseline 10.1.68.17 or later has been adapted and tested for iOS 14.

Important: As the basic library, the mPaaS version 10.1.68.27 and later have been adapted to iOS 14 built under Xcode 12.

Upgrade the SDK or components

Upgrade based on Extension plug-in

Use the mPaaS Xcode Extension plug-in to upgrade SDK/components. You can choose the following two methods：

- Update product set
- Upgrade Baseline

Choose the upgrade method according to your own situation：

- If you have already used the Extension plug-in to manage component dependencies, however, the current baseline version is lower than 10.1.68. You can use the **upgrade baseline function** to upgrade to version 10.1.68.

  > **Note**
  >
  > You can view the currently used baseline version in the **upgrade baseline** of the plug-in.

- If you have already used plug-in to manage component dependencies, and the baseline version is 10.1.68, then you can use **Update product set** feature to upgrade modules you are using.

- If you have not used plug-in to manage component dependencies, you can upgrade by following steps:
  i. Install mPaaS Xcode Extension.
  ii.

Upgrade based on CocoaPods

Install the latest SDK of version **10.1.68** by completing the following steps:

1. Check that the mPaaS version is **10.1.68** in Podfile.
2. Run the command `pod mpaas update 10.1.68`.

   If an error is returned, run the command `pod mpaas update --all` to update the plug-in and then rerun the previous command.
3. Run the `pod install` command.

Handle custom baselines

If you are using a custom baseline, you may need to customize the baseline again based on the new version. To do this, submit a ticket or contact mPaaS technical support personnel for consultation.

5.8. mPaaS 10.1.60 baseline adapt to iOS 13

Background

iOS 13 was officially released on September 20, 2019. During the testing of the iOS 13 beta and official versions, we found that some behaviors of the system changed. Therefore, you must perform app adaptation before using it, otherwise problems such as functional exceptions and crashes may occur.

Before the mPaaS adaptation, the major impact on the mPaaS SDK built by Xcode 10 on iOS 13 devices is as follows. **Since iOS 13 optimizes app startup and modifies the mirror loading mechanism, the system category may overwrite the category methods defined in the SDK. As a result, custom methods cannot return expected results.**

Important: As the basic library, the mPaaS version 10.1.60.26 and later have been adapted to iOS 13 built under Xcode 11.

Upgrade the SDK or components

Upgrade based on CocoaPods

Install the latest SDK of version **10.1.60** by completing the following steps.

1. Check that the mPaaS version is **10.1.60** in Podfile.
2. Run the command `pod mpaas update 10.1.60`.

   If an error is returned, run the command `pod mpaas update --all` to update the plug-in and then rerun the previous command.
3. Run the `pod install` command.

API changes

The mPaaS component added an adaptation layer in version 10.1.32 and later. We recommend that you use the API of the adaptation layer after upgrading the SDK. For details, see the following upgrade instructions for different components:

- Mobile Gateway Service
- Configure project
- HTML5 Offline Packages
- Mobile Sync Service
- Client diagnosis
- Publishing Management

Notes:

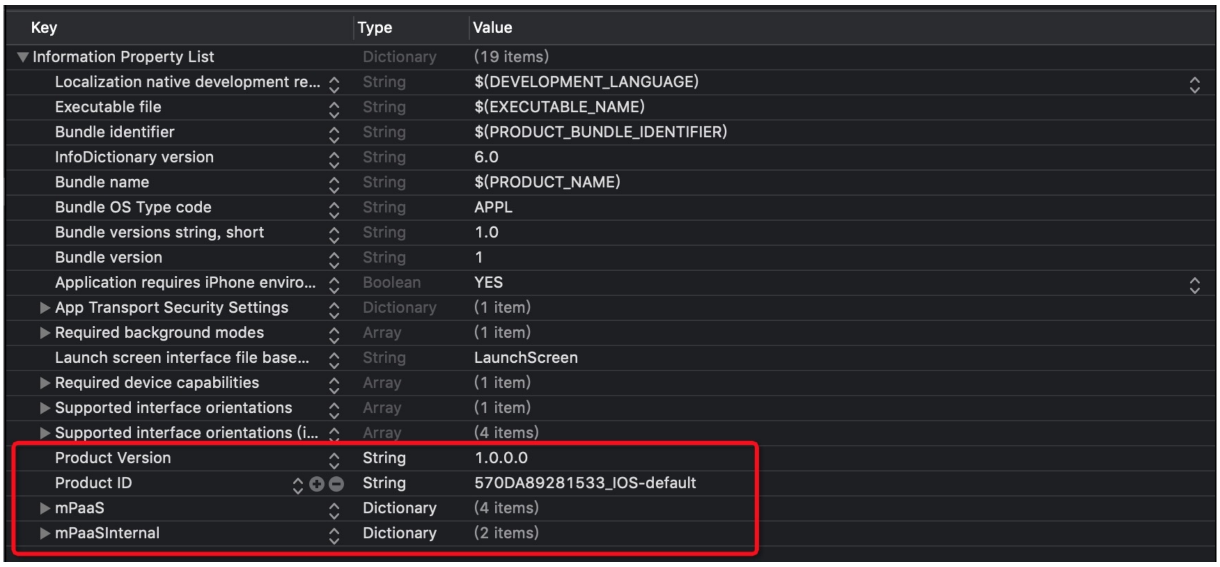
- Pay special attention to the directory and info.plist configuration changes for mPaaS components in the project.
- We strongly recommend that you modify the code and use middle-layer (adapter) methods instead of directly using underlying methods, because certain underlying methods may be modified or discarded in future versions. You may need to take lots of time adapting them in future updates if you continue to use them.

Change of the directory structure

Among the component category directories and files under the `MPaaS` directory of the project, only `APMobileFramework` and `mPaas` are kept after the upgrade. All the other directories, such as `APRemoteLogging` , is automatically removed. If there are any custom files saved under these directories, you need to back up them in advance. For details of the directory structure, see mPaaS directory structure.

Change of Info.plist

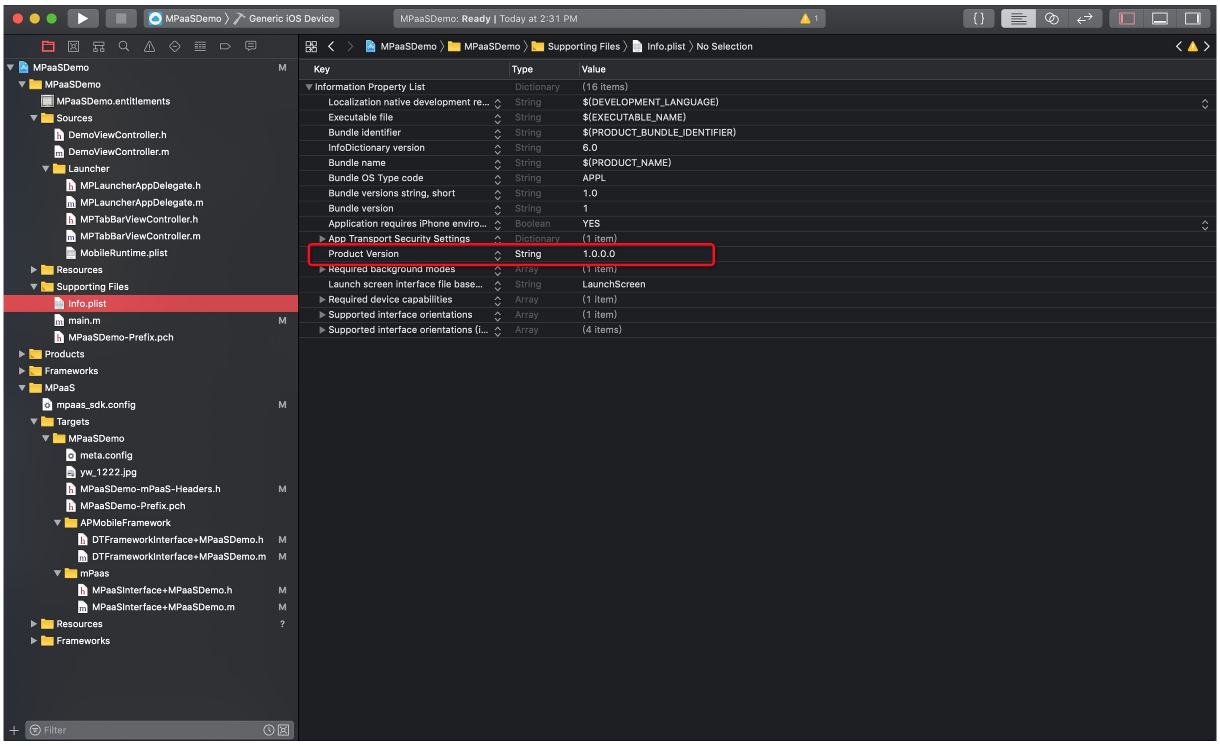
The following figure shows the related mPaaS fields inserted in the Info.plist file of the project before the upgrade.



Key	Type	Value
▼ Information Property List	Dictionary	(19 items)
Localization native development re...	String	$(DEVELOPMENT_LANGUAGE)
Executable file	String	$(EXECUTABLE_NAME)
Bundle identifier	String	$(PRODUCT_BUNDLE_IDENTIFIER)
InfoDictionary version	String	6.0
Bundle name	String	$(PRODUCT_NAME)
Bundle OS Type code	String	APPL
Bundle versions string, short	String	1.0
Bundle version	String	1
Application requires iPhone enviro...	Boolean	YES
▶ App Transport Security Settings	Dictionary	(1 item)
▶ Required background modes	Array	(1 item)
Launch screen interface file base...	String	LaunchScreen
▶ Required device capabilities	Array	(1 item)
▶ Supported interface orientations	Array	(1 item)
▶ Supported interface orientations (i...	Array	(4 items)
Product Version	String	1.0.0.0
Product ID	String	570DA89281533_IOS-default
▶ mPaaS	Dictionary	(4 items)
▶ mPaaSInternal	Dictionary	(2 items)

In 10.1.32 and later versions, only the `Product Version` field is required. After the baseline is upgraded, the plug-in automatically removes the `Product ID` , `mPaaS` , and `mPaaSInternal` fields. If the plug-in fails to remove these fields, you need to delete them manually. The following figure shows the fields after the upgrade.

Note: Do not delete the `Product Version` field when you delete the fields manually.



Key	Type	Value
Information Property List	Dictionary	(16 items)
Localization native development re...	String	$(DEVELOPMENT_LANGUAGE)
Executable file	String	$(EXECUTABLE_NAME)
Bundle identifier	String	$(PRODUCT_BUNDLE_IDENTIFIER)
InfoDictionary version	String	6.0
Bundle name	String	$(PRODUCT_NAME)
Bundle OS Type code	String	APPL
Bundle versions string, short	String	1.0
Bundle version	String	1
Application requires iPhone enviro...	Boolean	YES
App Transport Security Settings	Dictionary	(1 item)
Product Version	String	1.0.0.0
Required background modes	Array	(1 item)
Launch screen interface file base...	String	LaunchScreen
Required device capabilities	Array	(1 item)
Supported interface orientations	Array	(1 item)
Supported interface orientations (i...	Array	(4 items)

Handle custom libraries

The components in version 10.1.60 incorporate customization requirements. However, if your dependencies include custom libraries, you must take the following actions to handle them accordingly for security reasons.

- If you upgraded the SDK from an earlier version (such as 10.1.20) to 10.1.60, you may need to customize custom libraries again based on the new version. To do this, submit a ticket or contact mPaaS technical support personnel.
- If the SDK version is 10.1.60, update certain components. See List of libraries adapted to iOS 13 updates to check whether your custom libraries are contained in the list.
  - If no, you can continue to use these custom libraries.
  - If yes, you may need to customize them again. To do this, submit a ticket or contact mPaaS technical support personnel.

List of libraries adapted to iOS 13 updates

- mPaas
- MPDataCenter
- MPPushSDK
- APMultimedia
- BEEAudioUtil
- BeeCapture
- BeeCityPicker
- BeeMediaPlayer
- BeePhotoBrowser
- BeePhotoPicker
- NebulaAppBiz

- NebulaBiz
- NebulaSecurity
- NebulaKernel
- NebulaSDKPlugins
- NebulaSDK
- NebulaConfig
- NebulaTinyAppDebug
- NebulaNetwork
- TinyAppCommon
- APConfig
- AntUI
- MPPromotion
- BeeLocation
- MPMpaaSService
- TinyAppService
- AMap

5.9. mPaaS 10.1.32 baseline adapt to iOS 13

Important: Since June 28, 2020, mPaaS has discontinued the maintenance of the 10.1.32 baseline. We recommend that you use the 10.1.68 or 10.1.60 baseline.

Background

iOS 13 was officially released on September 19, 2019. During the testing of iOS 13, we found that some behaviors of the system changed. Therefore, you must perform app adaptation before using it. Otherwise problems such as functional exceptions and crashes may occur.

Before the adaptation of mPaaS to iOS 13, the major impact on the mPaaS SDK built by Xcode 10 on iOS 13 devices is as follows: **Since iOS 13 optimizes app startup and modifies the mirror loading mechanism, the system category may overwrite the category methods defined in the SDK. As a result, custom methods cannot return expected results.**

Status quo

As a basic library, mPaaS has been adapted to iOS 13 built under XCode 10. Since mPaaS is currently adapted only for Xcode 10 packaging, **you must use Xcode 10 for packaging** and submit the package to App Store.

The tool chain for Xcode 11 is not yet complete. With the enhancement of the tool chain, mPaaS will release a version adapted to iOS 13 built under Xcode 11.

Upgrade the SDK or components

Upgrade based on CocoaPods

Install the latest SDK of version **10.1.32** by completing the following steps.

1. Check that the mPaaS version is **10.1.32** in Podfile.
2. Run the command `pod mpaas update 10.1.32`.

   If an error is returned, run the command `pod mpaas update --all` to update the plug-in and then rerun the previous command.
3. Run the `pod install` command.

API changes

The mPaaS component added an adaptation layer in version 10.1.32. We recommend that you use the API of the adaptation layer after upgrading the SDK. For details, see the following upgrade instructions for different components:

- Mobile Gateway Service
- HTML5 Offline Packages
- Mobile Sync Service
- Client diagnosis
- Publishing Management

Notes:

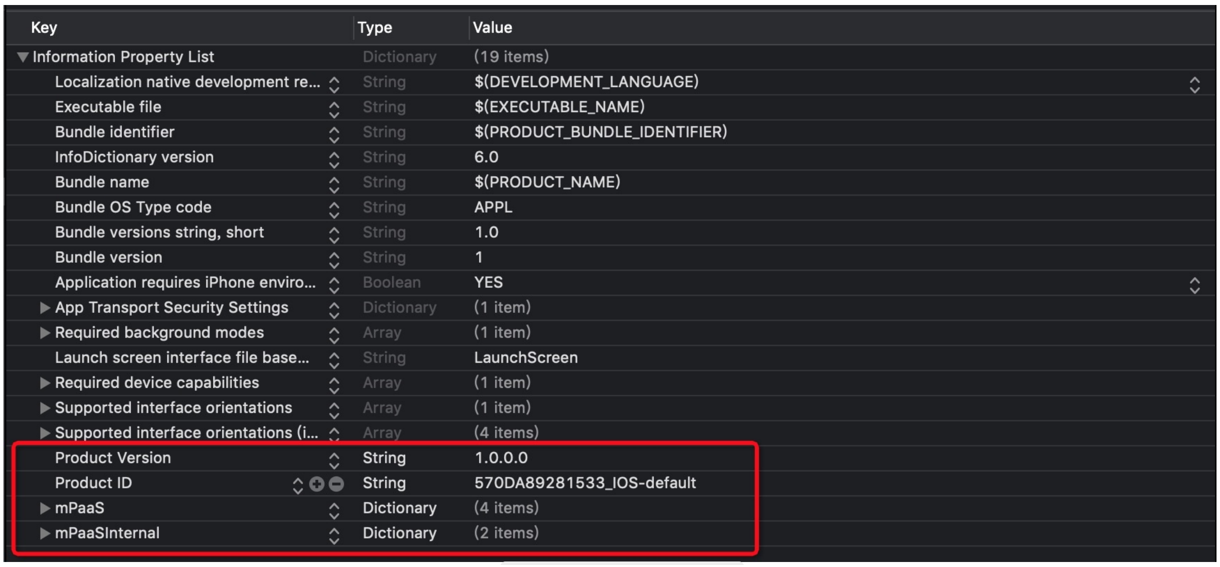
- Pay special attention to the directory and info.plist configuration changes for mPaaS components in the project.
- We strongly recommend that you modify the code and use middle-layer (adapter) methods instead of directly using underlying methods, because certain underlying methods may be modified or discarded in future versions. You may need to take lots of time adapting them in future updates if you continue to use them.

Change of the directory structure

Among the component category directories and files under the `MPaaS` directory of the project, only `APMobileFramework` and `mPaas` are kept after the upgrade. All the other directories, such as `APRemoteLogging`, is automatically removed. If there are any custom files saved under these directories, you need to back up them in advance. For details of the directory structure, see mPaaS directory structure.

Change of Info.plist

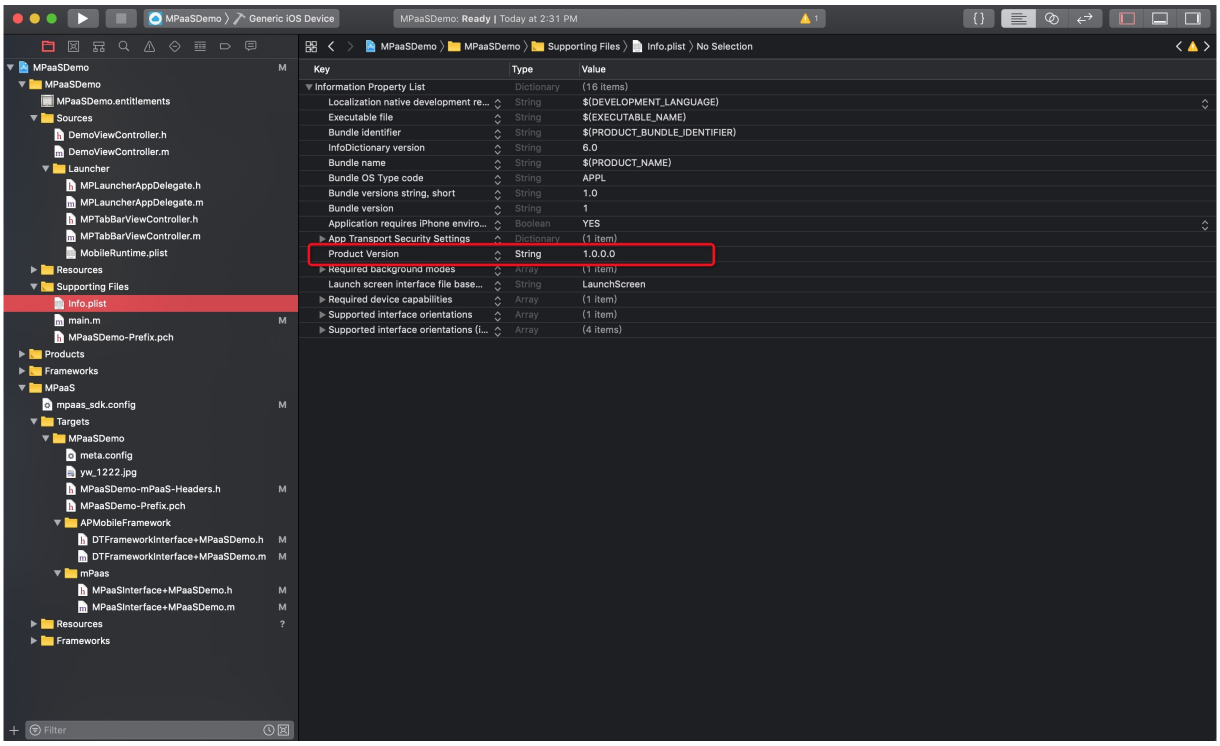
The following figure shows the related mPaaS fields inserted in the `Info.plist` file of the project before the upgrade.



Key	Type	Value
▼ Information Property List	Dictionary	(19 items)
Localization native development re...	String	$(DEVELOPMENT_LANGUAGE)
Executable file	String	$(EXECUTABLE_NAME)
Bundle identifier	String	$(PRODUCT_BUNDLE_IDENTIFIER)
InfoDictionary version	String	6.0
Bundle name	String	$(PRODUCT_NAME)
Bundle OS Type code	String	APPL
Bundle versions string, short	String	1.0
Bundle version	String	1
Application requires iPhone enviro...	Boolean	YES
▶ App Transport Security Settings	Dictionary	(1 item)
▶ Required background modes	Array	(1 item)
Launch screen interface file base...	String	LaunchScreen
▶ Required device capabilities	Array	(1 item)
▶ Supported interface orientations	Array	(1 item)
▶ Supported interface orientations (i...	Array	(4 items)
Product Version	String	1.0.0.0
Product ID	String	570DA89281533_IOS-default
▶ mPaaS	Dictionary	(4 items)
▶ mPaaSInternal	Dictionary	(2 items)

In 10.1.32 and later versions, only the `Product Version` field is required. After the baseline is upgraded, the plug-in automatically removes the `Product ID`, `mPaaS`, and `mPaaSInternal` fields. If the plug-in fails to remove these fields, you need to delete them manually. The following figure shows the fields after the upgrade.

Note: Do not delete the `Product Version` field when you delete the fields manually.



Key	Type	Value
Information Property List	Dictionary	(16 items)
Localization native development re...	String	$(DEVELOPMENT_LANGUAGE)
Executable file	String	$(EXECUTABLE_NAME)
Bundle identifier	String	$(PRODUCT_BUNDLE_IDENTIFIER)
InfoDictionary version	String	6.0
Bundle name	String	$(PRODUCT_NAME)
Bundle OS Type code	String	APPL
Bundle versions string, short	String	1.0
Bundle version	String	1
Application requires iPhone enviro...	Boolean	YES
App Transport Security Settings	Dictionary	(1 item)
Product Version	String	1.0.0.0
Required background modes	Array	(1 item)
Launch screen interface file base...	String	LaunchScreen
Required device capabilities	Array	(1 item)
Supported interface orientations	Array	(1 item)
Supported interface orientations (i...	Array	(4 items)

Handle custom libraries

The components in version 10.1.32 incorporate customization requirements. However, if your dependencies include custom libraries, you must take the following actions to handle them accordingly for security reasons.

- If you upgraded the SDK from an earlier version to 10.1.32, you may need to customize custom libraries again based on the new version. To do this, submit a ticket or contact mPaaS technical support personnel for confirmation.
- If the SDK version is 10.1.32, upgrade certain components. See List of libraries adapted to iOS 13 updates to check whether your custom libraries are contained in the list.
  - If no, you can continue to use these custom libraries.
  - If yes, you may need to customize them again. To do this, submit a ticket or contact mPaaS technical support personnel.

List of libraries adapted to iOS 13 updates

- mPaas
- MPDataCenter
- APMultimedia
- BEEAudioUtil
- BeeCapture
- BeeCityPicker
- BeeMediaPlayer

- BeePhotoBrowser
- BeePhotoPicker
- NebulaAppBiz
- NebulaBiz
- NebulaSDKPlugins
- APConfig
- AntUI
- NebulaSDK
- TinyAppCommon
- MPPromotion

6.Reference

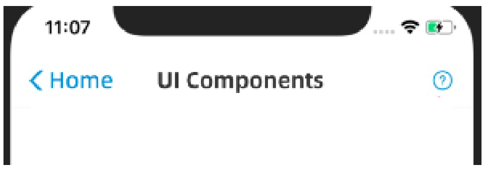
6.1. Customize the iOS navigation bar

During app development, it is often required to customize the top navigation bar. This topic describes how to customize the navigation bar on a page created **based on the MPaaS framework** and including customizing the theme of the app and customizing the navigation bar style for a specific page.

Basic concepts

Distribution of navigation bar elements

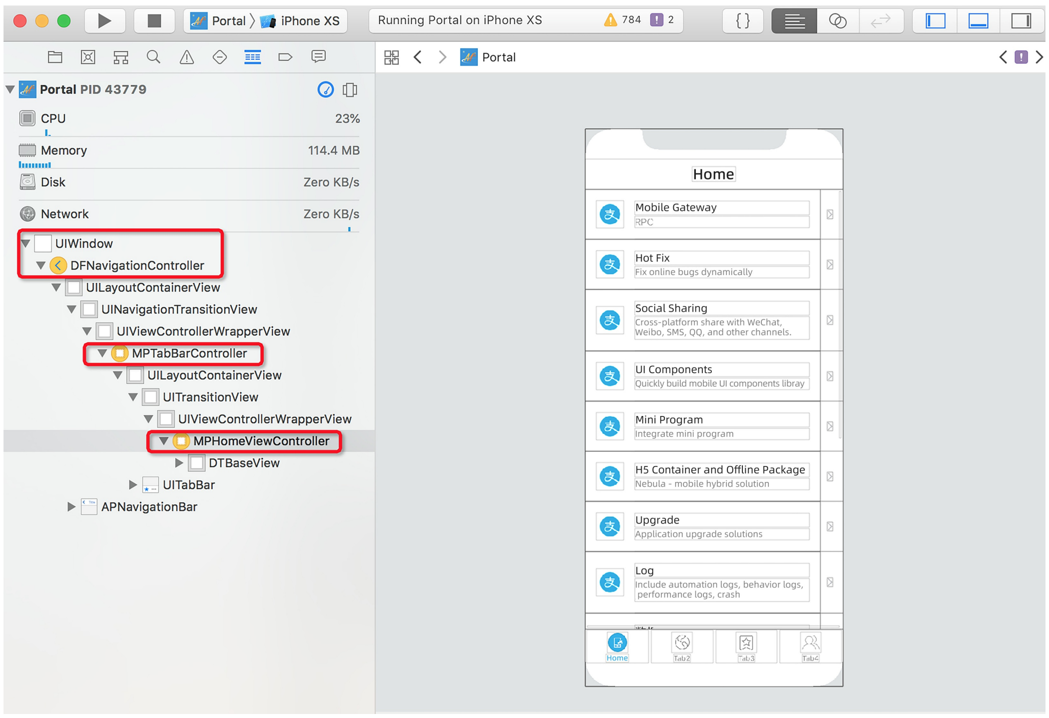
Navigation bar elements are mainly distributed in three areas. Generally, navigation bar customization involves modifying these areas.



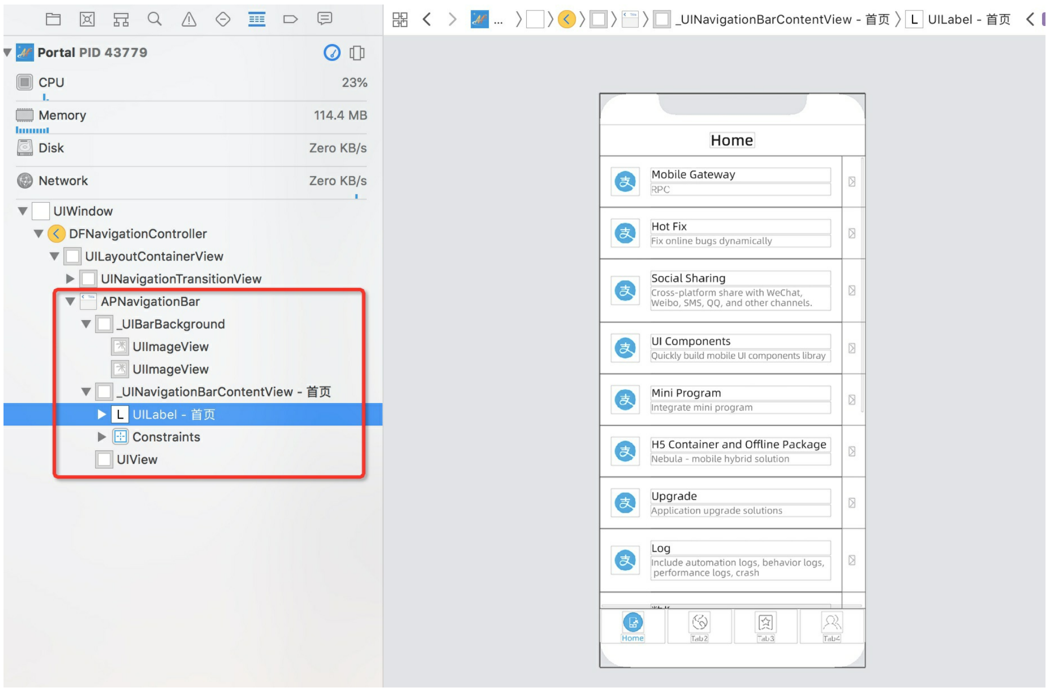
1. Back: The Back button control area that is created by the base class of the mPaaS page. The default format is back arrow + “Back”.
2. Title/Subtitle: The title bar control area, which is not displayed by default. To display this area, call the system method to set the title of the current page.
3. Option menu: The page menu option area, which is not displayed by default. To display this area, call the system method to set rightNavigationItem for the current page.

Navigation bar structure

- As shown in the following figure, the default UI structure for apps created based on the mPaaS framework is as follows: `window/navigationController` > `tabViewController` > `viewController` embedded for each tab. In other words, the root of the main window of the app is a `UINavigationController` object, and the root of `UINavigationController` is a `UITabViewController`.

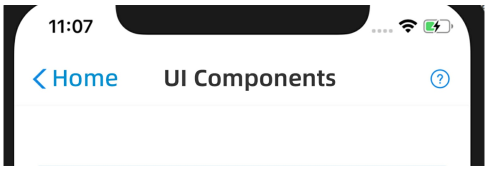


- The preceding UI structure shows that the entire app has only one `navigationController` globally. Therefore, all pages share the same navigation bar (created by using `APNavigationBar` by default).



- For unifying the navigation bar styles of all pages, it is required that in the mPaaS app, all VCs where a page resides must inherit `DTViewControler`, including the native and HTML5 pages.

- The default theme of the app created based on the mPaaS framework is characterized by a white background, black text, and blue button.



Customize the theme of the app

Each app has its own theme. Modify the default theme of the mPaaS app as follows:

- To modify the background color of the navigation bar, back control area, or title control area, rewrite the `au_defaultTheme_extraInfo` method of the AUThemeManager class and modify the return values of the following keys:
  - API method

```
@interface AUThemeManager(AUExtendinfo)
/* Default theme is set for Alipay client, and is modifiable for independent apps.
* n this method only need to return a key-value pair different from the default the
me. Please use the key defined in AUTheme.h.
*/
+(NSDictionary *)au_defaultTheme_extraInfo;

@end
/*
*   Example
*   +(NSDictionary*)au_defaultTheme_add_Info
*   {
*     NSMutableDictionary *dict = [INSMutableDictionary alloc] init];
*     dictITITLEBAR_BACKGROUND_COLOR] = AU_COLOR_APP_GREEN; // AUTitleBar background
color
*     dit[TITLEBAR TITLE TEXTCOLOR1 = [UIColor redColor]; // AUTitleBar title color
*     ...
*     return dict;
*   }
*/
```

- Sample code

```
  @implementation AUThemeManager (Portal)

+ (NSDictionary *)au_defaultTheme_extraInfo
{
    NSMutableDictionary *dict = [[NSMutableDictionary alloc] init];
    dict[TITLEBAR_BACKGROUND_COLOR] = @"COLOR(#108EE9,1)"; // Set the background co
lor of the navigation bar
    dict[TITLEBAR_LINE_COLOR] = @"COLOR(#108EE9,1)";       // Set the color of the
separation line or sideline at the bottom of the navigation bar
    dict[TITLEBAR_TITLE_TEXTCOLOR] = @"COLOR(#ffffff,1)";  // Set the title text co
lor of the navigation bar
    dict[TITLEBAR_TITLE_TEXTSIZE_BOLD] = @"FONT(18)";      // Set the title text fo
nt size of the navigation bar
    dict[TITLEBAR_TEXTCOLOR] = @"COLOR(#ffffff,1)";        // Set the Back button c
olor of the navigation bar

    return dict;
}

@end
}
```

> **Note**
>
> Note: You must set the color value in the COLOR(#108EE9,1) format, otherwise an error will be returned.

- To modify the Back button icon in theme configuration, rewrite the `au_default_backButtonImg` method in the AUBarButtonItem class.
  - API method

```
#import "AUUILoadDefine.h"//The program automatically generates.
#ifdef ANTUI_UI_TitleBar_AUBarButtonltem//The program automatically generates.
//
// AUBarButtonltem+AUExtendInfo.h
// AntUI
//
// Copyright © 2017 Alipay. All rights reserved.
//
#import "AUBarButtonltem.h"

@interface AUBarButtonltem(AUExtendInfo)

//Default return button is a blue icon for Alipay, and is modifiable for independen
t apps.
+(UIImage *)au_default_backButtonlmg;

@end
```

- Sample code

  ```
  @implementation AUBarButtonItem (CGBBarButtonItem)

   + (UIImage *)au_default_backButtonImg
   {
       // Customize the Back icon
       return  APCommonUILoadImage(@"back_button_normal_white");

   }
   @end
  ```

- Modify the Back button style and text for all pages.

Customize the navigation bar style for a specific page

In addition to themes, sometimes you need to customize the navigation bar style for the current page, for example, modify the background color or Back button style. mPaaS provides different methods for modification at different times.

- **Before loading a page**, to modify the navigation bar color on the basis of the default navigation bar style, implement the method defined in DTNavigationBarAppearanceProtocol and modify the color of the corresponding area.
  - API method

```
@protocol DTNavigationBarAppearanceProtocol<NSObject>

@optional

/** Whether this DTViewController needs to automatically hide navigationBar. The de
fault value is NO, If a ViewController in business needs to hide navigationBar, rel
oad this method and return YES.
**/
-(BOOL)autohideNavigationBar;

/** If the current VC needs to set a hidden navigation bar as fully transparent, an
d set the current page with the return copy matching the framework logic., reload t
his method and return an instance of APCustomerNavigationView.
-(UIView *)customNavigationBar;

/** If a viewcontroller needs to set its titlebar as opaque and assign a color to t
he titlebar, rewrite this method and return the expected color.
* Only for the pushed VC. VC in tabbar can not modify the translucent property of
navigationBar.
*/
-(UIColor *)opaqueNavigationBarColor;

/**
* If a viewcontroller needs to modify the style of status bar, rewrite this method
and return the expected style.
 */
- (UIStatusBarStyle)customStatusBarStytle;

/**
 *  If a viewcontroller wants to modify the color of the navigation bar title, plea
se override this method and return the desired color.
 */
- (UIColor *)customNavigationBarTitleColor;
```

- Sample code

```
#pragma mark DTNavigationBarAppearanceProtocol: Modify the navigation bar style whe
n entering the page.
- (UIColor *)opaqueNavigationBarColor
{
    // Set the background color of the navigation bar to red for the current page .
    return [UIColor redColor];

//    // Set the navigation bar to transparent for the current page
//    return [UIColor colorWithRGB:0xff0000 alpha:0];
}

- (BOOL)autohideNavigationBar
{
    // Set whether to hide the navigation bar for the current page
    return NO;
}

- (UIStatusBarStyle)customStatusBarStyle
{
    // Set the status bar style for the current page
    return UIStatusBarStyleDefault;
}

- (UIColor *)customNavigationBarBackButtonTitleColor
{
    // Set the text color of the Back button for the current page
    return [UIColor greenColor];
}

- (UIImage *)customNavigationBarBackButtonImage
{
    // Set the Back icon for the current page.
    return APCommonUILoadImage(@"back_button_normal_white");
}

- (UIColor *)customNavigationBarTitleColor
{
    // Set the title color for the current page.
    return [UIColor greenColor];
}
```

- **After a page is opened**, you can modify the navigation bar style and the menu button on the right side of the page during your operations. For example, you can make the background color to change gradually when you slide the slider. Modification of the following areas is supported:
    - Background area: Hide/Show the navigation bar, set the navigation bar to transparent, modify the background color of the navigation bar, and modify the color of the status bar.

```
- (void)gotoHideNavigator
{
    // Hide the navigation bar
    [self.navigationController.navigationBar setHidden:YES];
}

- (void)gotoShowNavigator
{
    // Show the navigation bar
    [self.navigationController.navigationBar setHidden:NO];
}

- (void)gotoTransparency
{
    // Set the navigation bar to transparent
    [self.navigationController.navigationBar setNavigationBarTranslucentStyle];
}

- (void)gotoUpdateBackgroundColor
{
    // Modify the background color of the navigation bar
    [self.navigationController.navigationBar setNavigationBarStyleWithColor:[UIColo
r whiteColor] translucent:NO];
    [self.navigationController.navigationBar setNavigationBarBottomLineColor:[UICol
or whiteColor]];
}

- (void)gotoUpdateStatusBarStyle
{
    // Modify the status bar color
    [[UIApplication sharedApplication]
setStatusBarStyle:UIStatusBarStyleLightContent];
}
```

- Back control area: Modify the default text and color of the Back button, modify the default arrow style of the Back button, and reset the style of the Back button.

```
- (void)gotoUpdateBackTitleColor
{
    // Modify the default text color of the Back button
    NSArray *leftBarButtonItems = self.navigationItem.leftBarButtonItems;
    if ([leftBarButtonItems count] == 1) {
        if (leftBarButtonItems[0] && [leftBarButtonItems[0] isKindOfClass:
[AUBarButtonItem class]]) {
            AUBarButtonItem *backItem = leftBarButtonItems[0];
            backItem.titleColor = [UIColor blackColor];
        }
    }
}

- (void)gotoUpdateBackImage
{
    // Modify the default arrow style of the Back button
    NSArray *leftBarButtonItems = self.navigationItem.leftBarButtonItems;
    if ([leftBarButtonItems count] == 1) {
        if (leftBarButtonItems[0] && [leftBarButtonItems[0] isKindOfClass:
[AUBarButtonItem class]]) {
            AUBarButtonItem *backItem = leftBarButtonItems[0];
            backItem.backButtonImage = APCommonUILoadImage(@"back_button_normal");
        }
    }
}

- (void)gotoUpdateBackItem
{
    // Reset the style of the Back button
    self.navigationItem.leftBarButtonItem = [AUBarButtonItem
barButtonItemWithImageType:AUBarButtonImageTypeDelete target:self
action:@selector(onClickBack)];
}

- (void)onClickBack
{
    [self.navigationController popViewControllerAnimated:YES];
}
```

- Title control area: Modify the default title color, set the title and subtitle, and enable the title to be displayed as a picture.```
- (void)gotoUpdateTitleColor{ // Modify the title color [self.navigationController.navigationBar setNavigationBarTitleTextAttributesWithTextColor:[UIColor blackColor]];}
- (void)gotoTwoTitle{ // Modify the title style: title and subtitle self.navigationItem.titleView = [[AUDoubleTitleView alloc] initWithTitle:@”Title” detailTitle:@”Subtitle”];}
- (void)gotoTitleImage{ // Modify the title style to picture UIImageView *imageView = [[UIImageView alloc] initWithImage:APCommonUILoadImage(@”ilustration_ap_expection_alert”)]; imageView.frame = CGRectMake(0, 0, self.self.view.width-100, 64); self.navigationItem.titleView = imageView;}```

- Menu control area: Set a single or multiple menu buttons on the right.

```
- (void)gotoSetOptionMenu
{
    // Set a single button on the right side
    self.navigationItem.rightBarButtonItem = [AUBarButtonItem
barButtonItemWithImageType:AUBarButtonImageTypeGroupChat target:self
action:@selector(onClickRightItem)];
}

- (void)gotoSetTwoOptionMenu
{
    // Set two buttons on the right side
    AUBarButtonItem *item1 = [AUBarButtonItem
barButtonItemWithImageType:AUBarButtonImageTypeGroupChat target:self
action:@selector(onClickRightItem)];
    AUBarButtonItem *item2 = [AUBarButtonItem
barButtonItemWithImageType:AUBarButtonImageTypeHelp target:self
action:@selector(onClickRightItem)];
    self.navigationItem.rightBarButtonItems = @[item1, item2];
}
```

- **Immersive navigation bar**: In immersive mode, the navigation bar is transparent when you access the page, and opaque after you slide to a specified position. The details are as follows:
    - Set the navigation bar to be transparent when you access the page. Rewrite the following API in the VC where the current page resides.

```
 - (UIColor *)opaqueNavigationBarColor
   {
       // Set the navigation bar to transparent for the current page
       return [UIColor colorWithRGB:0xff0000 alpha:0];
   }
```

- After sliding to a specified position, modify the styles of the background area, back area, title area, and menu area of the navigation bar.

```
  - (void)gotoUpdateBackgroundColor
  {
      // Modify the background color of the navigation bar
      [self.navigationController.navigationBar setNavigationBarStyleWithColor:[UICo
lor whiteColor] translucent:NO];
      [self.navigationController.navigationBar setNavigationBarBottomLineColor:[UIC
olor whiteColor]];
  }

  - (void)gotoUpdateBackTitleColor
  {
      // Modify the default text color of the Back button
      NSArray *leftBarButtonItems = self.navigationItem.leftBarButtonItems;
      if ([leftBarButtonItems count] == 1) {
          if (leftBarButtonItems[0] && [leftBarButtonItems[0] isKindOfClass:
[AUBarButtonItem class]]) {
              AUBarButtonItem *backItem = leftBarButtonItems[0];
              backItem.titleColor = [UIColor blackColor];
          }
      }
  }

  - (void)gotoUpdateTitleColor
  {
      // Modify the title color
      [self.navigationController.navigationBar
setNavigationBarTitleTextAttributesWithTextColor:[UIColor blackColor]];
  }
```

6.2. Handle iOS conflict

When accessing mPaaS, the mPaaS SDK may conflict with other open-source libraries or third-party libraries introduced into the project, leading to project compilation failure. This topic introduces the solutions to two common types of conflicts.

Based on the types of libraries that cause the conflict, two categories of solutions are available:

- mPaaS custom libraries: If custom libraries of the mPaaS SDK conflict with other libraries in the project, you must use these custom mPaaS libraries.
- Non-mPaaS custom libraries: If conflicting mPaaS SDK libraries are not mPaaS custom libraries, you can delete the libraries introduced by mPaaS.

Solutions to conflicting mPaaS custom libraries

If conflicting mPaaS SDK libraries are custom libraries, you must use these custom mPaaS libraries.

Open-source library name	mPaaS library name	Conflict solution

AlipaySDK	AlipaySDK	The mPaaS version, which solves conflicts with modules such as mPaaS RPC and UTDID, must be used. At the same time, the mPaaS_RPC component needs to be integrated.
OpenSSL	APOpenSSL	The mPaaS version, which optimizes the original national secret algorithm, must be used. For more details, please refer to How to solve the OpenSSL conflict in iOS projects.
protocolBuffers	APProtocolBuffers	The mPaaS version must be used.

Solutions to non-mPaaS custom libraries

If conflicting mPaaS SDK libraries are not mPaaS custom libraries, you can delete the libraries introduced by mPaaS. The deletable libraries are shown in the following table. For details, see Remove conflicting third-party libraries to remove the conflicting libraries.

Components supported by remove_pod	Open-source libraries contained
mPaaS_SDWebImage	SDWebImage
mPaaS_Masonry	Masonry
mPaaS_MBProgressHud	MBProgressHUD
mPaaS_TTTAttributedLabel	TTTAttributedLabel
mPaaS_Lottie	Lottie
mPaaS_AMap	AMapSearchKit
	AMapFoundationKit
	MAMapKit
mPaaS_Security	SecurityGuard SGMain
mPaaS_APWebP	WebP

Remove conflicting third-party libraries

If the conflicting mPaaS SDK library is not a mPaaS custom library, you can delete the library introduced by mPaaS according to the following procedures.

Procedure

1. Install the beta version of the cocoapods-mPaaS plug-in.

   > **Note**
   >
   > The beta version of the cocoapods-mPaaS plug-in is supported only in the 10.1.68 baseline.

   ```
   sh <(curl -s http://mpaas-ios-test.oss-cn-
   hangzhou.aliyuncs.com/cocoapods/installmPaaSCocoaPodsPlugin.sh)
   ```

   After the installation is completed, run the command `pod mpaas version --plugin` to verify that the installed version is the beta version.
2. Run the `pod mpaas update 10.1.68` command again to update the local baseline.
3. Introduce `remove_pod "mPaaS_xxx"` to podfile and be sure to place remove_pod before a common mPaaS_pod command.

   For example, to remove SDWebImage, run this command: remove_pod “mPaaS_SDWebImage”.

   ```
   remove_pod "mPaaS_SDWebImage"
   mPaaS_pod "mPaaS_CommonUI"
   pod 'xxx' # The corresponding third-party native library
   ```
4. After you remove the mPaaS component library, you can run the `pod install` command to introduce the native version.

6.3. Switch iOS environment

During app development, the app environment (namely, workspace) may occasionally change, and the app may be developed in multiple workspaces in parallel. mPaaS provides a tool for you to conveniently switch among environments (workspaces) during development. There are two types of workspace switching modes:

- Static workspace switching
- Dynamic workspace switching

Static workspace switching

In static workspace switching, the default `meta.config` configuration file in the project is manually replaced on the client and then repackaged for access in a new workspace.

> **Note**
>
> This method is only applicable to scenarios where only the configuration information of the current application environment is updated.

1. Replace the `meta.config` file of the current project with the mPaaS plug-in.
2. Delete and then reinstall the app and the new workspace configuration information takes effect immediately.

Dynamic workspace switching

In dynamic workspace switching, workspace options in mobile phone settings are modified to dynamically modify the app workspace information without repackaging on the client.

> **Note**
>
> - This mode applies to a scenario where an app is developed in multiple workspaces in parallel and is frequently switched among them in the development phase.
> - The dynamic workspace switching feature is only supported on Apsara Stack.

Restricted by the mPaaS security signature verification mechanism, updating workspace configuration information modifies the WSG signature verification image `yw_1222.jpg`. Therefore, dynamic workspace switching has two restrictions.

- The dynamic workspace switching mode applies only to the development phase. Therefore, be sure to delete the corresponding configuration before the app is released.
- Signature verification for network requests must be disabled in the mPaaS console. Otherwise, requests will fail due to incorrect signature verification image information.

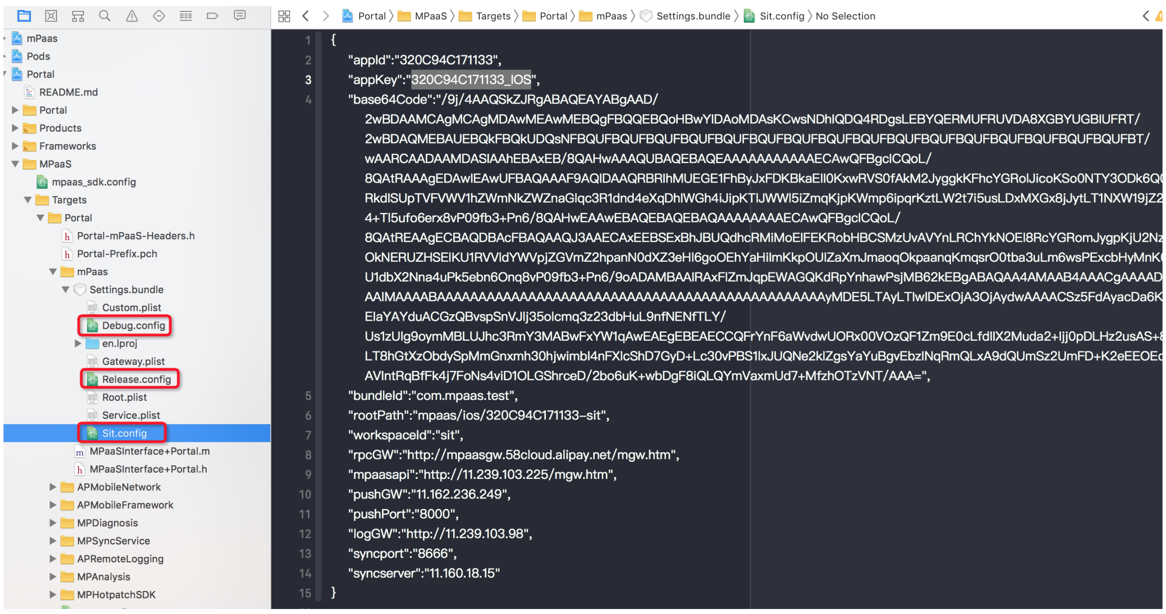
```
![ ddd](http://docs-aliyun.cn-hangzhou.oss.aliyun-
inc.com/assets/pic/111262/AntCloud_zh/1552905359956/%E5%9B%BE%E7%89%874.png)
```

Workspace information configuration

1. Enable dynamic workspace switching. Specifically, rewrite the `enableSettingService` method in `category` of `MPaaSInterface` and return YES.

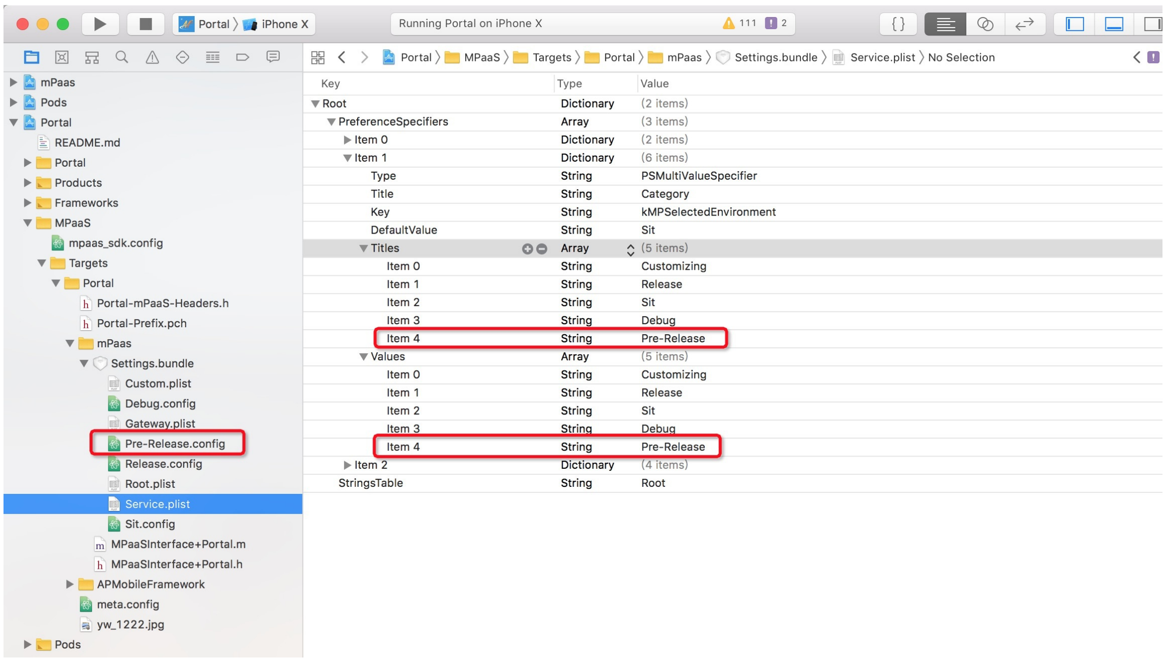
   ```
   @implementation MPaaSInterface (Portal)

   - (BOOL)enableSettingService
   {
       return YES;
   }

   @end
   ```

2. Download the workspace configuration file Settings.bundle.zip, and then add it to the project.
3. Understand the workspace configuration information in `Setting.bundle`.
   - `Setting.bundle` provides four workspaces by default, corresponding to the 4 configuration files: Debug, Sit, Release, and Custom respectively.
   - Among them, Debug, Sit and Release are preset workspaces. You need to download the configuration files of the target workspaces from the mPaaS console. Rename them to Debug, Sit, and Release, and use them to replace the example files in the original `Setting. bundle`.



```
{
    "appId":"320C94C171133",
    "appKey":"320C94C171133_IOS",
    "base64Code":"/9j/4AAQSkZJRgABAQEAYABgAAD/
      2wBDAAMCAgMCAgMDAwMEAwMEBQgFBQQEBQoHBwYIDAoMDAsKCwsNDhIQDQ4RDgsLEBYQERMUFRUVDA8XGBYUGBIUFRT/
      2wBDAQMEBAUEBQkFBQkUDQsNFBQUFBQUFBQUFBQUFBQUFBQUFBQUFBQUFBQUFBQUFBQUFBQUFBQUFBQUFBQUFBT/
      wAARCAADAAMDASIAAhEBAxEB/8QAHwAAAQUBAQEBAQEAAAAAAAAAAAECAwQFBgcICQoL/
      8QAtRAAAgEDAwIEAwUFBAQAAAF9AQIDAAQRBRIhMUEGE1FhByJxFDKBkaEII0KxwRVS0fAkM2JyggkKFhcYGRolJicoKSo0NTY3ODk6Q
      RkdlSUpTVFVWV1hZWmNkZWZnaGlqc3R1dnd4eXqDhIWGh4iJipKTlJWWl5iZmqKjpKWmp6ipqrKztLW2t7i5usLDxMXGx8jJytLT1NXW19jZ2
      4+Tl5ufo6erx8vP09fb3+Pn6/8QAHwEAAwEBAQEBAQEBAQAAAAAAAAECAwQFBgcICQoL/
      8QAtREAAgECBAQDBAcFBAQAAQJ3AAECAxEEBSExBhJBUQdhcRMiMoEIFEKRobHBCSMzUvAVYnLRChYkNOEl8RcYGRomJygpKjU2Nz
      OkNERUZHSElKU1RVVldYWVpjZGVmZ2hpanN0dXZ3eHl6goOEhYaHiImKkpOUlZaXmJmaoqOkpaanqKmqsrO0tba3uLm6wsPExcbHyMnK
      U1dbX2Nna4uPk5ebn6Onq8vP09fb3+Pn6/9oADAMBAAIRAxFlZmJqpEWAGQKdRpYnhawPsjMB62kEBgABAQAA4AMAAB4AAACgAAAD
      AAIMAAAABAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAyMDE5LTAyLTIwIDExOjA3OjAydwAAAACSz5FdAyacDa6K
      ElaYAYduACGzQBvspSnVJlj35olcmq3z23dbHuL9nfNENfTLY/
      Us1zUlg9oymMBLUJhc3RmY3MABwFxYW1qAwEAEgEBEAECCQFrYnF6aWvdwUORx00VOzQF1Zm9E0cLfdlIX2Muda2+Ijj0pDLHz2usAS+
      LT8hGtXzObdySpMmGnxmh30hjwimbI4nFXlcShD7GyD+Lc30vPBS1lxJUQNe2klZgsYaYuBgvEbzINqRmQLxA9dQUmSz2UmFD+K2eEEOE
      AVIntRqBfFk4j7FoNs4viD1OLGShrceD/2bo6uK+wbDgF8iQLQYmVaxmUd7+MfzhOTzVNT/AAA=",
    "bundleId":"com.mpaas.test",
    "rootPath":"mpaas/ios/320C94C171133-sit",
    "workspaceId":"sit",
    "rpcGW":"http://mpaasgw.58cloud.alipay.net/mgw.htm",
    "mpaasapi":"http://11.239.103.225/mgw.htm",
    "pushGW":"11.162.236.249",
    "pushPort":"8000",
    "logGW":"http://11.239.103.98",
    "syncport":"8666",
    "syncserver":"11.160.18.15"
}
```

- The Custom workspace applies to a scenario where repackaging is not performed on the client and app workspace information is directly configured in mobile phone settings. The configuration path on a mobile phone is Settings > Current app > Settings > Customizing. Enter the corresponding values based on the downloaded configuration information.
- To preset more workspaces in addition to the default Debug, Sit, Release, and Custom workspaces, add a configuration item in `Setting. bundle/Service. plist` and add the corresponding configuration file. The format is as follows:



Key	Type	Value
Root	Dictionary	(2 items)
PreferenceSpecifiers	Array	(3 items)
Item 0	Dictionary	(2 items)
Item 1	Dictionary	(6 items)
Type	String	PSMultiValueSpecifier
Title	String	Category
Key	String	kMPSelectedEnvironment
DefaultValue	String	Sit
Titles	Array	(5 items)
Item 0	String	Customizing
Item 1	String	Release
Item 2	String	Sit
Item 3	String	Debug
Item 4	String	Pre-Release
Values	Array	(5 items)
Item 0	String	Customizing
Item 1	String	Release
Item 2	String	Sit
Item 3	String	Debug
Item 4	String	Pre-Release
Item 2	Dictionary	(4 items)
StringsTable	String	Root

Dynamic workspace switching

- After the Settings.bundle workspace configuration file is added, the app configuration information will overwrite the default `meta.config` file in the project, and the workspace selected in `Settings.bundle` prevails. The path for viewing the currently selected workspace is: **Mobile phone Settings** > **mPaaS app** > **Settings** > **Category**. The Sit workspace is selected by default.

- To switch to another workspace, go to **Mobile phone Settings** > **mPaaS app** > **Settings** > **Category** and select the workspace. End the process and start it again for the new workspace to take effect.

7.FAQ of mPaaS framework

This section describes the mPaaS framework FAQ. Click a question to view its answer.

The error `ERROR: Failed to build gem native extension.d` occurred when I upgraded RubyGems.

If the error `ERROR: Failed to build gem native extension.` occurs when you upgrade RubyGems, install the Xcode command line tool and try again.

```
xcode-select --install
```

The error `Library not loaded` occurred when I installed the RVM.

If the error `For dyld: Library not loaded: /usr/local/lib/libgmp.10.dylib` occurred when you install Ruby 2.2.4 using the RVM, run the following command and try again.

```
brew update && brew install gmp
```

The error `Lazy symbol binding failed` occurred when I installed the RVM.

If the error `dyld: lazy symbol binding failed: Symbol not found: _clock_gettime` occurs when you install Ruby 2.2.4 using the RVM, install the Xcode command line tool and try again.

```
xcode-select --install
```

How to use my UIApplication delegate class?

If you do not use the mPaaS framework, you can override `DFClientDelegate` in the main method with your own class.

How to exit all micro applications and return to the Launcher?

```
[DTContextGet() startApplication:@"app ID of the launcher" params:nil
animated:kDTMicroApplicationLaunchModePushNoAnimation];
```

If Application B exists on top of Application A, how can Application B restart Application A and pass arguments?

Suppose Application A is started, and Application B on its top is also started. In this case, when Application A is restarted, Application B (and all applications on top of Application A) will exit.

```
[DTContextGet() startApplication:@"name of A" params:@{@"arg": @"something"}
launchMode:kDTMicroApplicationLaunchModePushWithAnimation];
```

Meanwhile, `DTMicroApplicationDelegate` of Application A will receive the following event, with arguments carried in `options`.

```
- (void)application:(DTMicroApplication *)application willResumeWithOptions:
(NSDictionary *)options
{
}
```

After the base class is inherited from DTViewController, the VC created using the XIB shows a white screen after it is opened.

Rewrite the `loadView` method in category of `DTViewController`, as shown in the following code.

```
@interface DTViewController (NibSupport)
@end

@implementation DTViewController (NibSupport)

- (void)loadView
{
    [super loadView];
}

@end
```