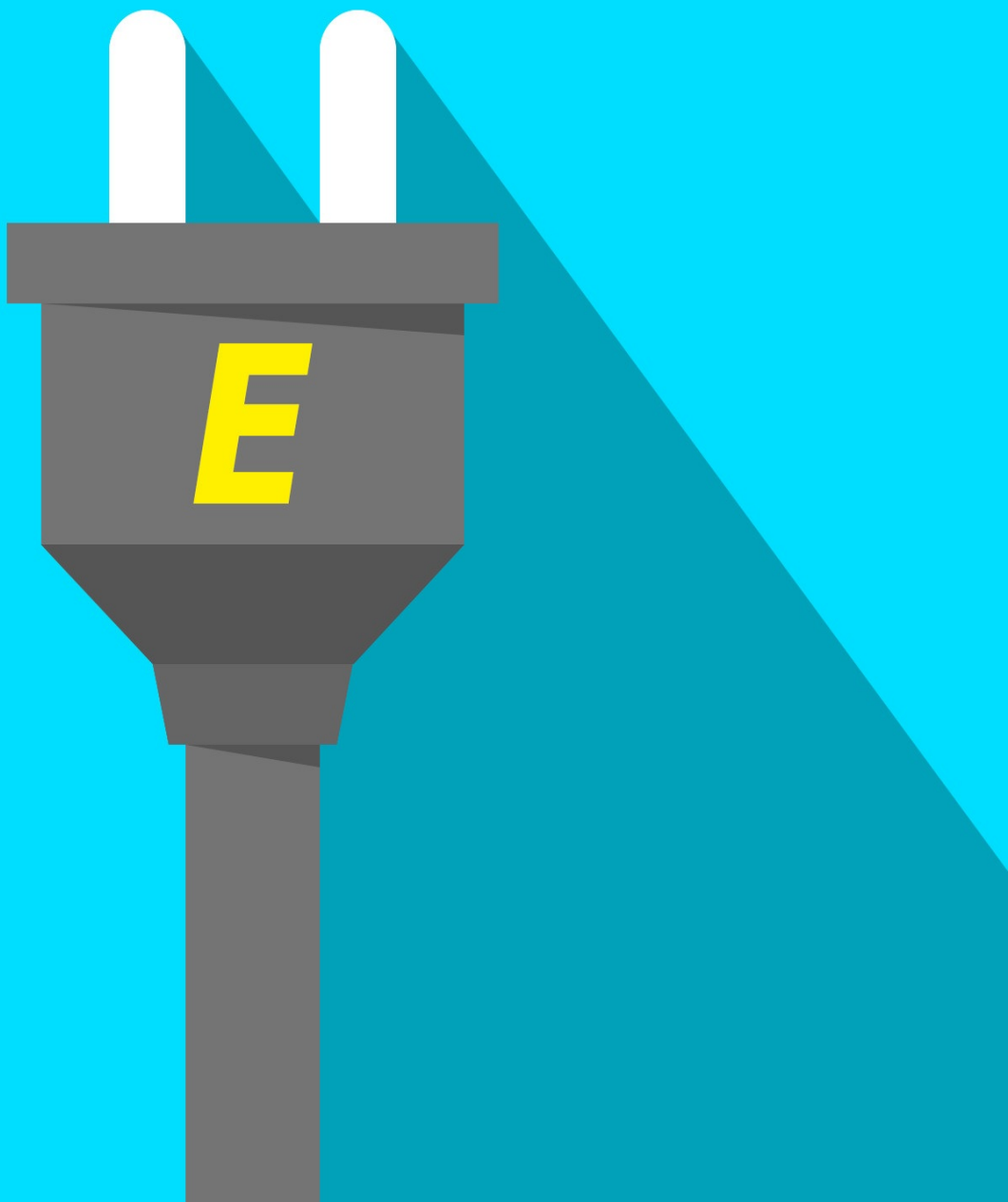
sglib

EASY MOBILE

User Guide



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Easy Mobile User Guide

This document is the official user guide for Easy Mobile, a Unity plugin family by SgLib Games.

Important Links

- Easy Mobile on Unity Asset Store
- Online Documentation
- Demo APK
- Easy Mobile: GIF Tools Version
- Easy Mobile: Lite Version

Connect with SgLib Games

- Unity Asset Store
- Facebook
- Twitter
- YouTube

Document Usage Notes

Users of the "Easy Mobile: GIF Tools" package please refer to three chapters: GIF, Native Sharing and Native UI only.

Introduction

Easy Mobile is our attempt to create a many-in-one Unity package that greatly simplifies the implementation of de facto standard features of mobile games including advertising, in-app purchasing, game service, notification and native mobile functionality. It does so by providing a friendly editor for setting up and managing things, and a cross-platform API which allows you to accomplish most tasks with only one line of code. It also leverages official plugins wherever possible, e.g. Google Play Games plugin for Unity, to ensure reliability and compatibility without reinventing the wheel.

> Easy Mobile supports two major mobile platforms: iOS and Android.

This plugin is currently divided into the following modules:

- **Advertising**
  - Compatible with AdColony, AdMob, Chartboost, Heyzap (with ad mediation) and Unity Ads
  - Automatic ad loading
  - Allows using multiple ad networks in one game
  - Allows different ad configurations for different platforms
- **Game Service**
  - Leverages Unity's GameCenterPlatform on iOS and Google Play Games plugin on Android
  - Custom editor for easy management of leaderboards and achievements
- **GIF**
  - Records screen, plays recorded clips and exports GIF images
  - High-performance, mobile-friendly GIF encoder
  - Giphy upload API for sharing GIF to social networks
- **In-App Purchasing**

    - Leverages Unity In-App Purchasing service
    - Custom editor for easy management of product catalog
    - Receipt validation

- **Native Sharing**
    - Shares texts, URLs and images using the native sharing functionality
- **Native UI**
    - Alerts and dialogs
    - Toasts (Android only)
- **Notification**
    - Compatible with OneSignal, a free and popular service for push notifications
- **Utilities**
    - Rating request: an effective way to ask for rating using the system-provided rating prompt of iOS (10.3+) and a native, highly customizable popup on Android

> The modular approach helps avoid inflating the build size by allowing you to enable only the modules that you use.

Requirements

- Unity 5.3.0 or above.

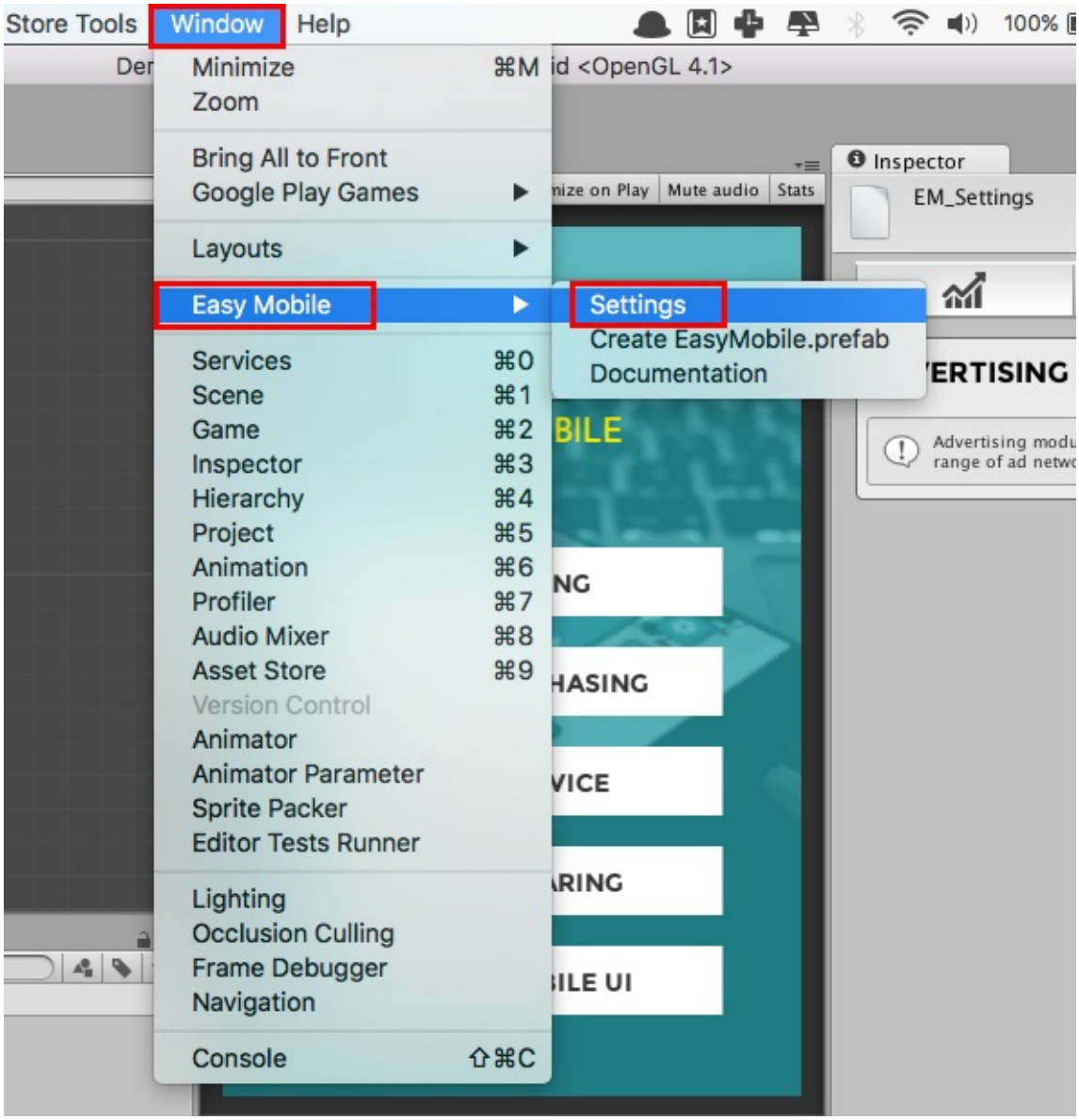
Using Easy Mobile

Using Easy Mobile involves 3 steps:

- Configure the plugin using the built-in Settings interface
- Make sure an instance of the EasyMobile prefab is added to your first scene
- Make appropriate API calls from script

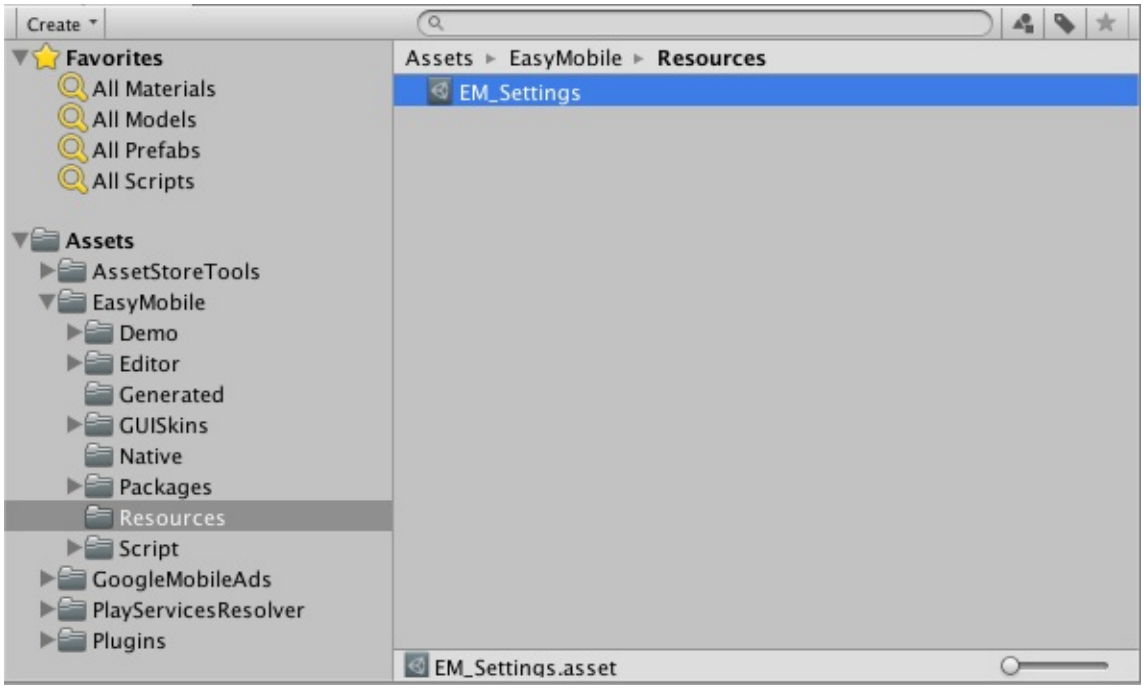
Configuration

After importing Easy Mobile, there will be a new menu added at *Window* > *Easy Mobile* from which you can access the Settings interface and configure various modules of the plugin.



The Settings interface is the only place you go to configure the plugin. Here you can enable or disable modules, provide ads credentials, add leaderboards, create a product catalog, etc.

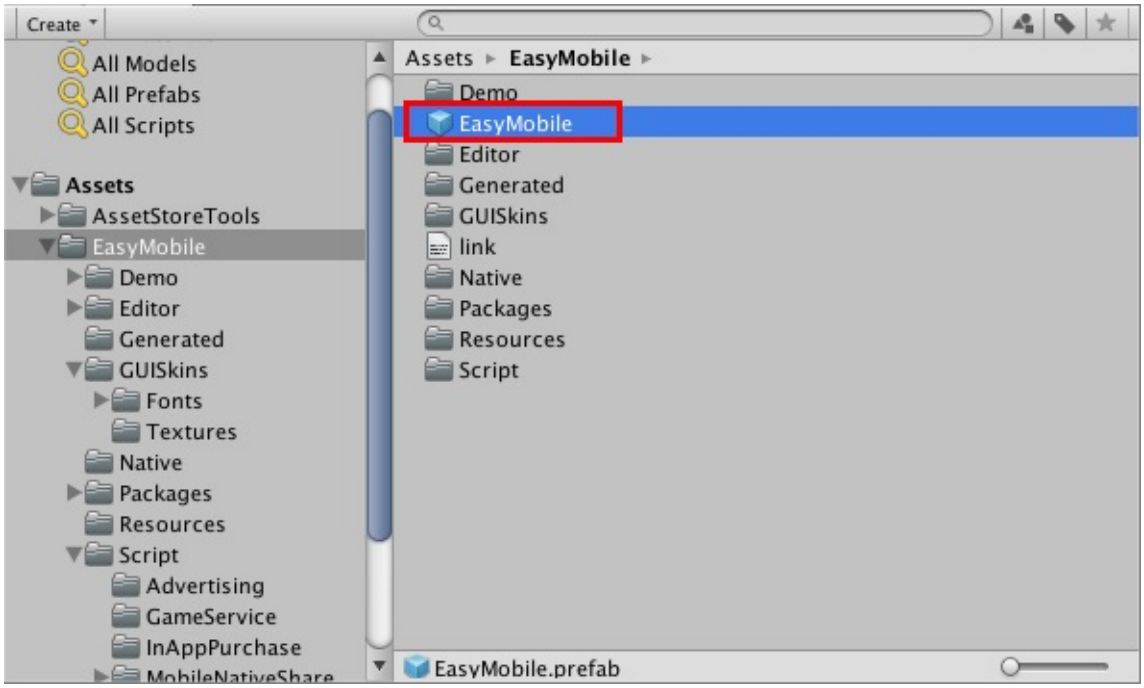
All these settings are stored in the EM_Settings object, which is a ScriptableObject created automatically after importing the plugin and is located at *Assets/EasyMobile/Resources*. You can also access this EM_Settings class from script and via its properties accessing each module settings in runtime.



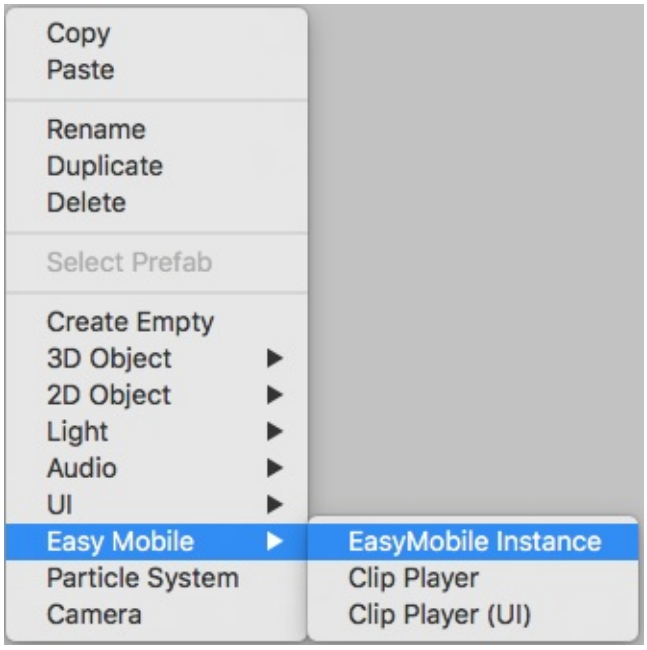
EasyMobile Prefab

For the plugin to function properly it is required that an instance of the EasyMobile prefab is added to one of the game scenes. The prefab is automatically created when importing the plugin and is located at its root folder. It will handle tasks like initialization and automatic ad loading.

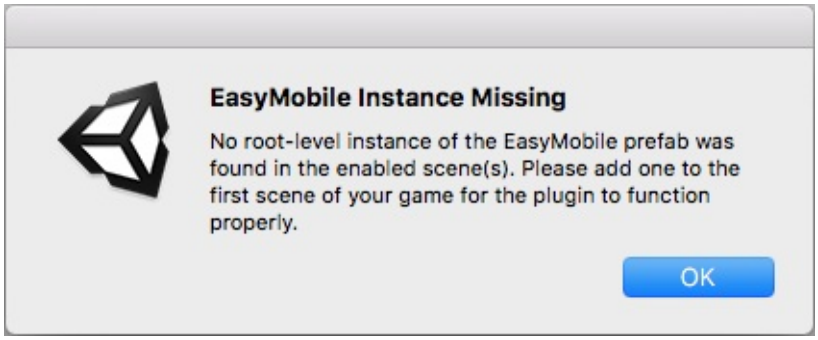
> It is advisable to add the EasyMobile prefab to the first scene in your game so that the modules have time to initialize before you actually use them. Likewise, this will allow the automatic ad loading process to start soon and the ads will be more likely available when needed.



To add an EasyMobile instance to your scene, simply right-click in the Hierarchy window to open the context menu (as you would when creating Unity built-in objects), then select *Easy Mobile* > *EasyMobile Instance*. Alternatively, you can just drag the prefab to the Hierarchy window, only make sure to make it a root-level object (parentless).



If you're using Unity 5.6 or newer, you'll get a warning if you start an iOS or Android build without having added the EasyMobile instance to one of your scenes.



Scripting

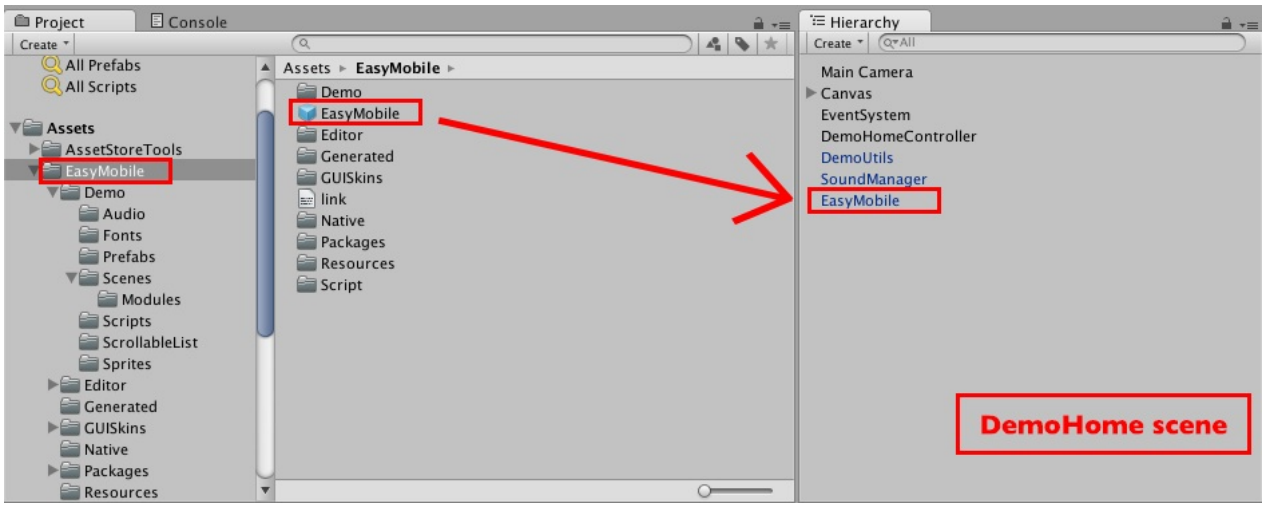
Easy Mobile API is written in C# and is put under the namespace EasyMobile. Therefore, you need to add the following statement to the top of your script in order to access its API methods.

```
using EasyMobile;
```

> Easy Mobile's API is cross-platform so you can use the same codebase for both iOS and Android.

Testing Using the Demo App

Easy Mobile comes with a demo app that you can use to quickly test each module' s operation after configuring. The demo app is contained in folder *Assets/EasyMobile/Demo*. To use the demo app, you need to add an instance of the EasyMobile prefab to the *DemoHome* scene located in the *Assets/EasyMobile/Demo/Scenes* folder.



Using PlayMaker Actions

Starting from version 1.1.3, Easy Mobile is officially compatible with PlayMaker, with nearly 100 custom actions ready to be used. You can install these actions from menu *Window* > *Easy Mobile* > *Install PlayMaker Actions*.

Easy Mobile's Demo App for PlayMaker

When installing the PlayMaker actions, a demo app will also be imported at *Assets/EasyMobile/Demo/PlayMakerDemo*. This demo is a copy of our main demo app, rebuilt using PlayMaker actions instead of C# scripts. You can take it as an example to get an insight into how Easy Mobile's PlayMaker actions can be used in practice.

Apart from installing PlayMaker (obviously), you need to do a few more setup steps as described below, before running this demo app.

Installing the Unity UI add-on for PlayMaker

Our PlayMaker demo app uses the Unity UI system, so you need to install the Unity UI add-on for PlayMaker.

Adding the EasyMobile Prefab Instance

Similar to the main demo app discussed above, you need to add an instance of the Easy Mobile prefab to the DemoHome_PlayMaker scene located in the *Assets/EasyMobile/Demo/PlayMakerDemo* folder.

Importing PlayMakerGlobals

The demo app uses global PlayMaker variables and events, so you need to import them before running the app.

If you project is new and doesn't have any PlayMakerGlobals (in the *Assets/PlayMaker/Resources* folder), simply copy our Globals over by these steps:

- Double-click the PlayMakerGlobals.unitypackage in the *Assets/EasyMobile/Demo/PlayMakerDemo* folder.
- Locate the newly created file PlayMakerGlobals_EXPORTED.asset right under the *Assets* folder.
- Rename the file to PlayMakerGlobals.asset and move it to the *Assets/PlayMaker/Resources* folder.

If you project already contains some global PlayMaker variables and events (a PlayMakerGlobals.asset file exists in the folder *Assets/PlayMaker/Resources)*, you can merge these with our demo's Globals using PlayMaker's Import Globals tool: go to menu

PlayMaker > *Tools* > *Import Globals* and select the PlayMakerGlobals.unitypackage in the *Assets/EasyMobile/Demo/PlayMakerDemo* folder.

Debug.Log Stop Working?

Once you added EasyMobile prefab to your scene, it will automatically configure the default logger such that *it is only enabled in the editor or in development builds*. Therefore, unless you're running the game in the editor or creating a development build, all the Debug.Log calls will be suppressed and nothing will be printed. In other words, to see the debug log produced by Easy Mobile (or any other scripts), you have to create development builds (to create development builds, check the "Development Build" option in the Build Settings dialog).

> Excluding debug logging in release builds is a common practice in app development, since it can have negative impact on the overall app performance.

Advertising

The Advertising module helps you quickly setup and show ads in your games. Here're some highlights of this module:

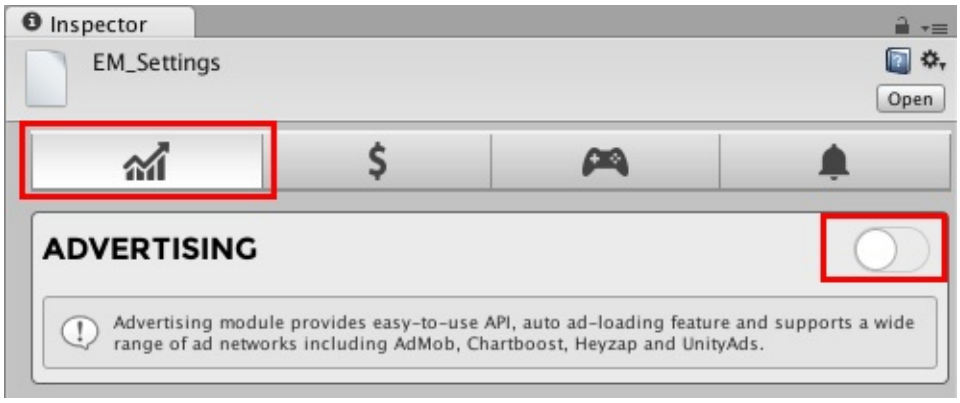
- **Supports multiple networks**
    - This module allows showing ads from most of top ad networks: AdColony, AdMob, Chartboost, Heyzap and Unity Ads
    - Even more networks can be used via Heyzap mediation
- **Using multiple networks in one game**
    - It's possible to use multiple ad neworks at the same time, e.g. use AdMob for banner ads, while using Chartboost for interstitial ads and Unity Ads for rewarded ads
    - Different configurations for different platforms are allowed, e.g. use Unity Ads for rewarded ads on Android, while using Chartboost for that type of ads on iOS
- **Automatic ad loading**
    - Ads will be fetched automatically in the background; new ad will be loaded if the last one was shown

The table below summarizes the ad types supported by Easy Mobile for each ad network.

Ad Network	Banner Ad	Interstitial Ad	Rewarded Ad
AdColony		◉	◉
AdMob	◉	◉	◉
Chartboost		◉	◉
Heyzap	◉	◉	◉
Unity Ads		◉	◉

Module Configuration

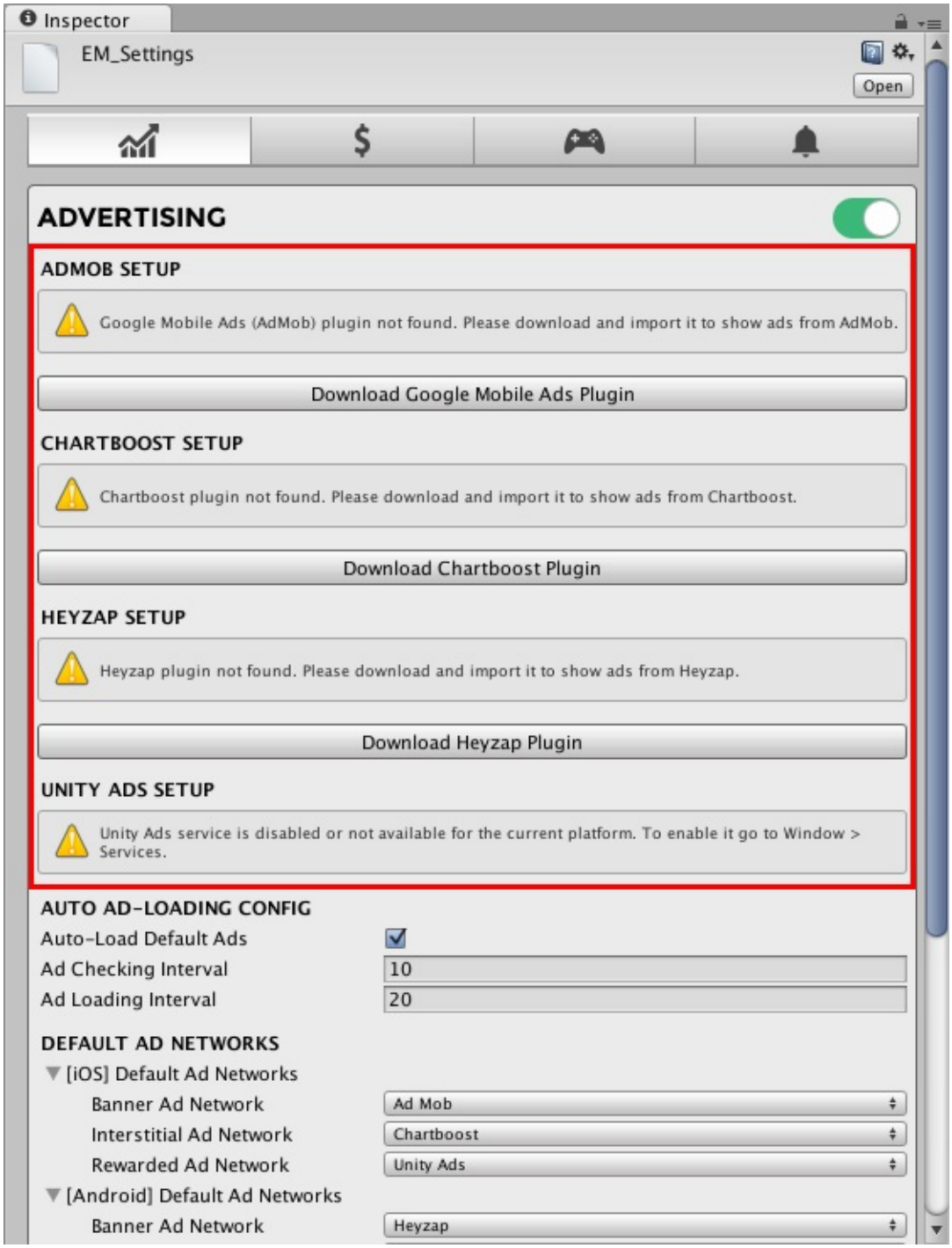
To use the Advertising module you must first enable it. Go to *Window* > *Easy Mobile* > *Settings*, select the Advertising tab, then click the right-hand side toggle to enable and start configuring the module.



Setup Ad Networks

The Advertising module works with top mobile ad networks: AdMob, Chartboost, Heyzap and Unity Ads. To show ads from a certain network you need to import its plugin (or enable the corresponding Unity service in case of Unity Ads). Easy Mobile will automatically check for the availability of these plugins and prompt you to download and import them if needed.

> Only import plugins for the ad networks you use to not increase the build size unnecessarily.



A Note on using Heyzap

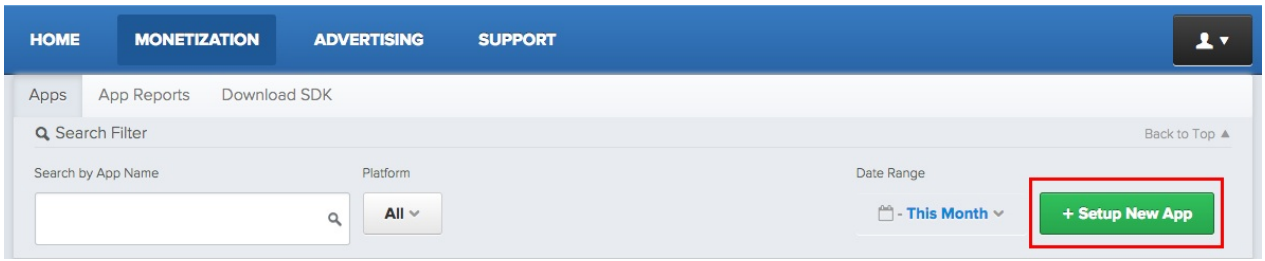
Heyzap can serve ads from multiple other networks thanks to its mediation feature. To do so it requires 3rd-party SDKs to be imported together with its own plugin. If you use Heyzap, you should not import the standalone-plugins of other networks (AdColony, AdMob, Chartboost, etc.), to avoid potential conflicts. Instead, use them as mediated networks under Heyzap and import their corresponding packages provided at the Heyzap download page.

AdColony

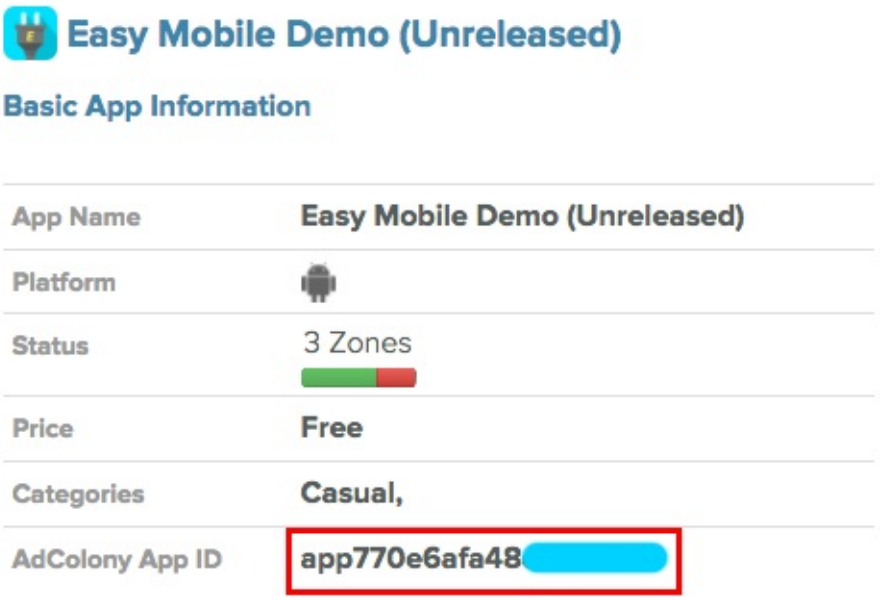
Create AdColony Apps and Zone Ids

To show ads from AdColony you need to create apps and ad zones in its clients portal. To access the clients portal, create an account and login to AdColony page.

In the clients portal, select **MONETIZATION** tab, then select the **Apps** sub-tab and click the **Setup New App** button.



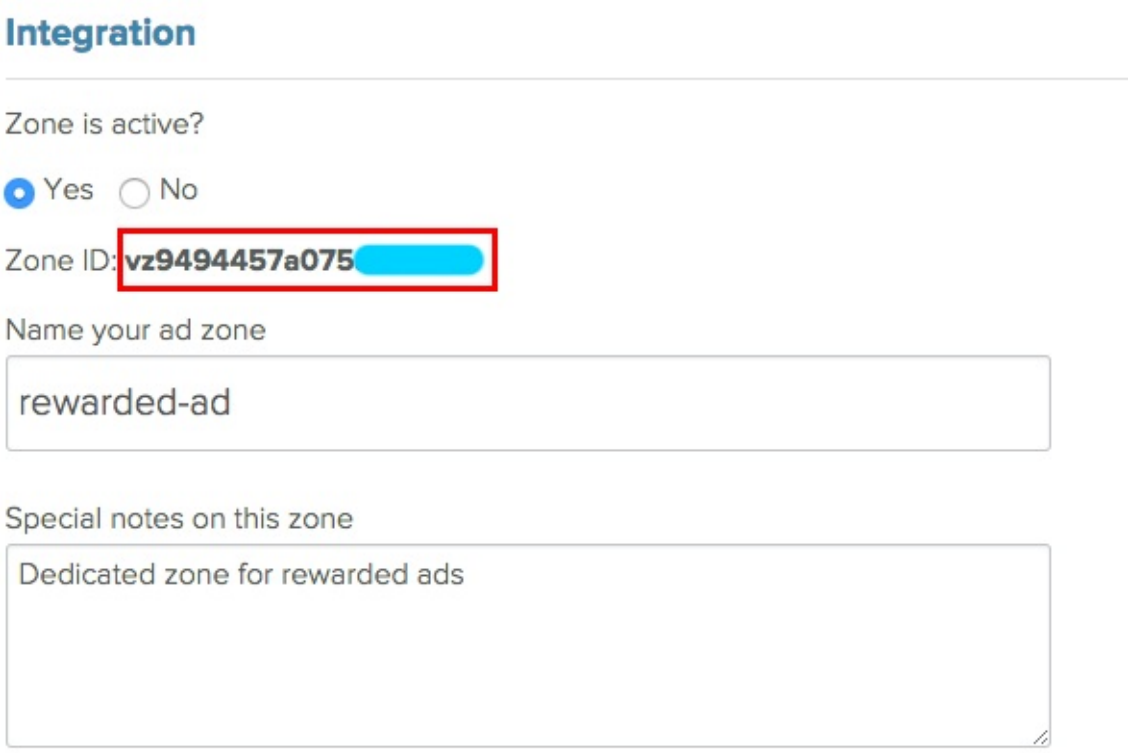
In the opened page enter the required information for your new app, e.g. app name, platform and location. You can also select the ad types that you would like to allow in your app. Hit **Create** when you're done, your app will be created and you'll be redirected back to the **Apps** page. Select your newly created app to reveal its information, which looks similar to the picture below. Note the **AdColony App ID** as we will use it later.



Now your app is ready, the next step is to create ad zones for it. Click the **Setup New Ad Zone** at the bottom of the app edit page to create a new ad zone.

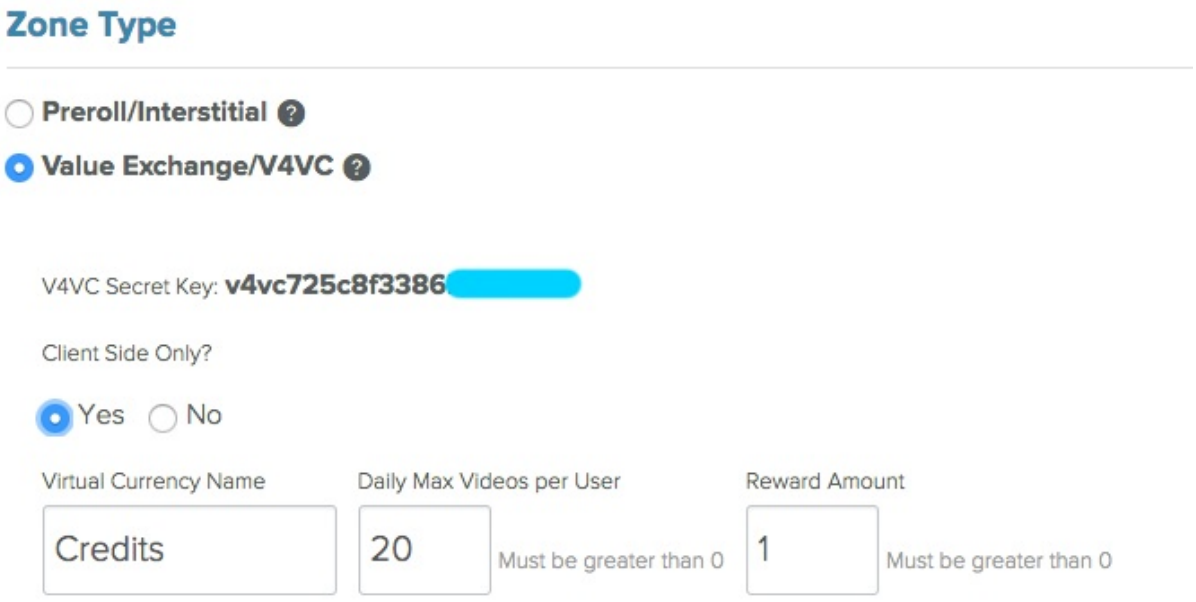
In the **Integration** section, give your ad zone a name, optional notes and set its as active. Note the **Zone ID** as we'll use it later.

> The Zone ID will appear once you save your new ad zone.

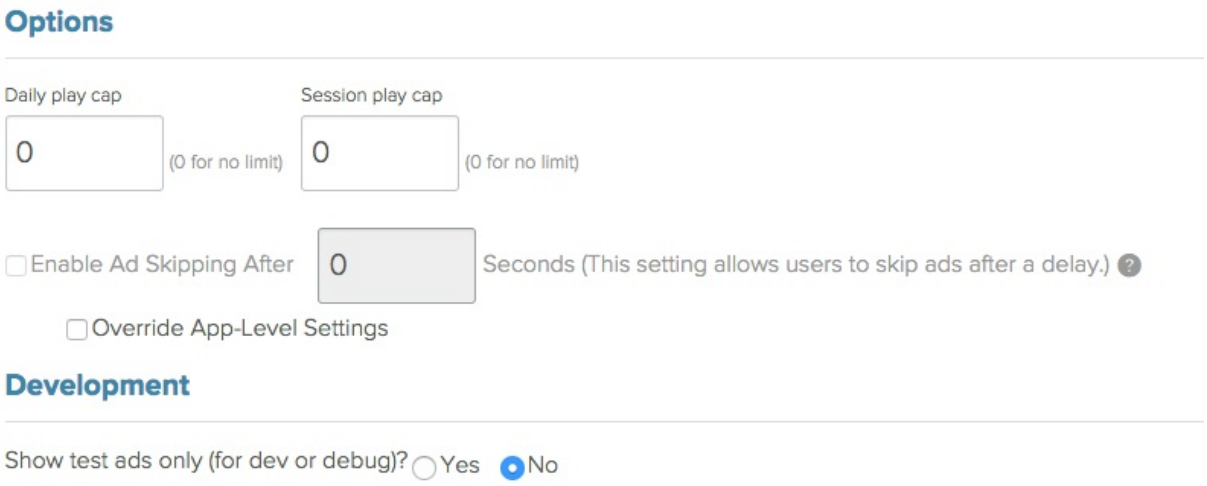


In the **Creative Type** section, select the **Video** option.

In the **Zone Type** section, select **Preroll/Interstitial** if you want to use this zone for interstitial video ads. Otherwise, select **Value Exchange/V4VC** to use it for rewarded ads.



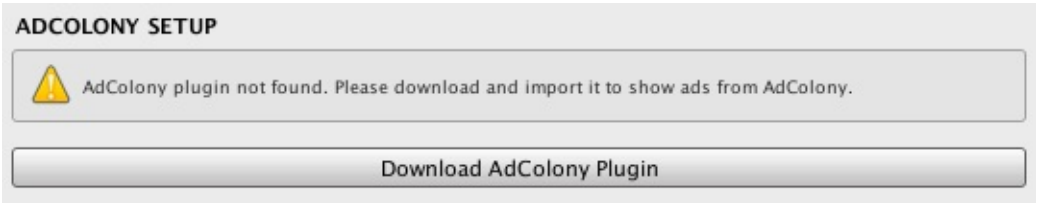
In the **Options** section, you can set a daily cap or a session cap to limit the number of ads served to a user per day or per session, respectively. In the **Development** section, you can choose to show test ads only (for debug purpose), don't forget to disable this option when your app is released.



Now your new ad zone is fully configured, click the **Save** button to save it. Repeat the process to create other ad zones to suit your needs. Typically, you'd want to have 2 ad zones, one for interstitial ads and one for rewarded ads. If you're targeting multiple platforms, create a new app for each platform, and for each app create the necessary ad zones.

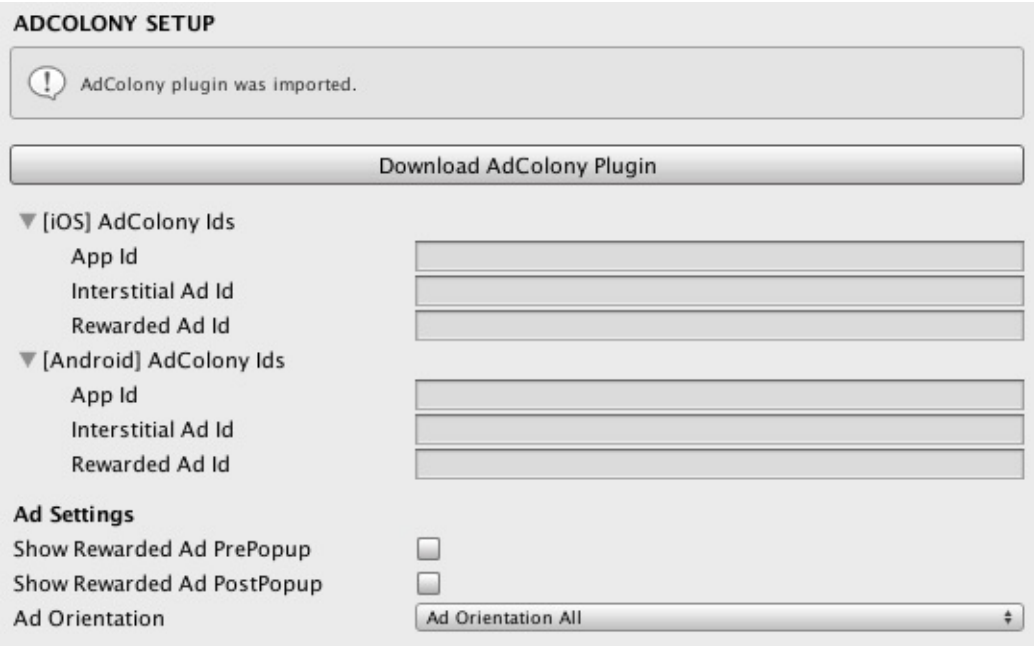
Import AdColony Plugin

To have your Unity app work with AdColony you need to import the AdColony plugin for Unity. In the **ADCOLONY SETUP** section of the Advertising module, click the *Download AdColony Plugin* button to to open the download page. Download the plugin and import it to your project.



Configure AdColony

After importing the AdColony plugin, the **ADCOLONY SETUP** section will be updated as below.

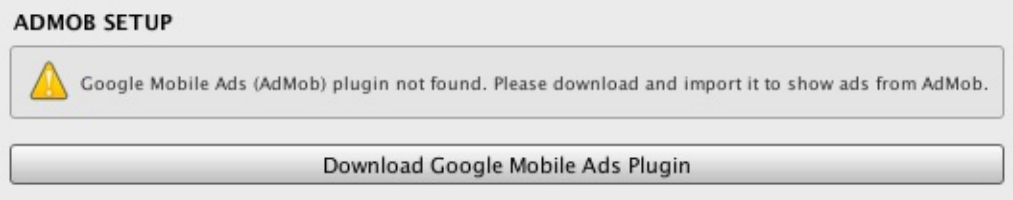


- *[iOS] AdColony Ids*: enter the app ID and zone IDs created in the AdColony clients portal for the iOS app
- *[Android] AdColony Ids*: enter the app ID and zone IDs for the Android app
- *Show Rewarded Ad PrePopup*: show the AdColony's default popup before a rewarded video starts
- *Show Rewarded Ad PostPopup*: show the AdColony's default popup after a rewarded video has finished
- *Ad Orientation*: select the orientation for the ads to match your app settings

AdMob

Import AdMob Plugin

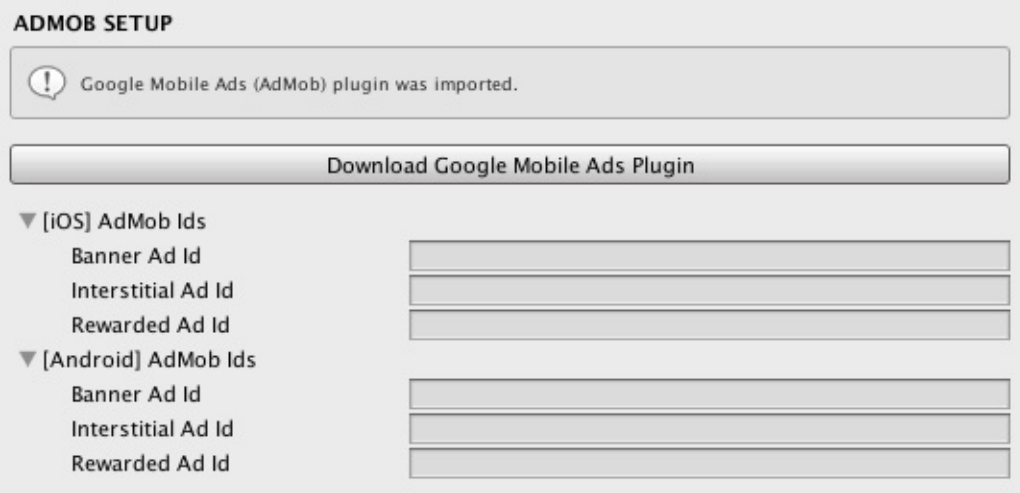
To show ads from AdMob you need to import the Google Mobile Ads plugin. In the **ADMOB SETUP** section, click the *Download Google Mobile Ads Plugin* button to to open the download page. Download the plugin and import it to your project.



Configure AdMob

Enter Ad IDs

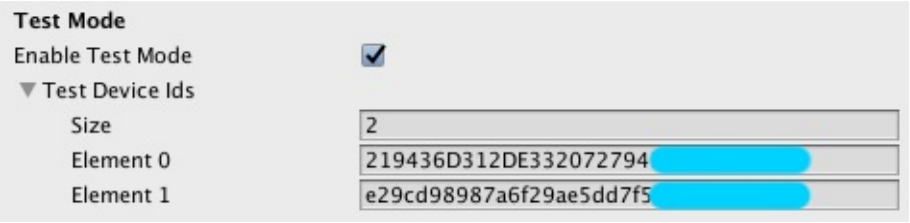
After importing Google Mobile Ads plugin, you can now enter the ad IDs for each platform.

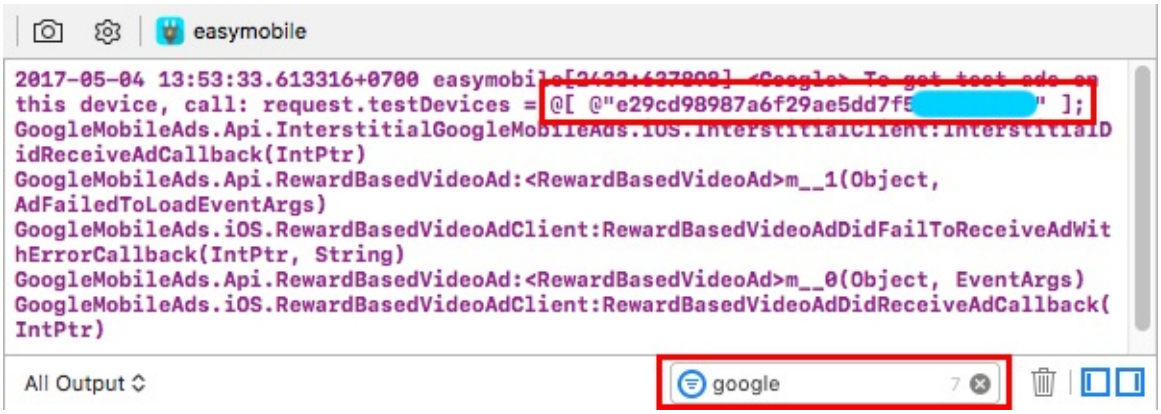


> Note that you only need to provide the IDs of the ad units you want to use, e.g. if you only use AdMob banner ad you can leave the interstitial ad and rewarded ad IDs empty.
>
> If you're not familiar with AdMob, follow the instructions here to create ad units and obtain the ad IDs; an ad ID should have the form of ca-app-pub-0664570763252260xxxxxxxxxx.

Using AdMob Test Mode

To enable AdMob's test mode, simply check the *Enable Test Mode* option and enter the IDs of your testing devices into the *Test Device Ids* array.



> You can find the ID of your test device by building and running the Easy Mobile demo app on that device. Remember to add the EasyMobile prefab to the DemoHome scene before starting the build.
>
> **Android device ID**
>
> - In Unity, build the Easy Mobile demo app for Android platform
> - Install and run the demo app on your testing device
> - Open Terminal (Mac) or Cmd (Windows) and type in
>
> ```
> adb logcat -s Ads
> ```
>
> (if you're on Windows, you may need to add the Android SDK path to the Windows System PATH)
>
> - In the demo app, select ADVERTISING and then click the SHOW BANNER AD button
> - Observe the output logcat in the Terminal/Cmd and locate a line similar to the one in the following image, the value between the double quotes is your device ID
>
> ```
> I Ads     : Starting ad request.
> I Ads     : Use AdRequest.Builder.addTestDevice("219436D312DE332072794[redacted]") to get test ads on this device.
> ```
>
> **iOS device ID**
>
> - In Unity, build the Easy Mobile demo app for iOS platform
> - Open the generated project in Xcode and run it on your testing device
> - Type 'google' into the filter box of the Xcode Console, and find your device ID between the double quotes as highlighted in the following image
>
> 
>

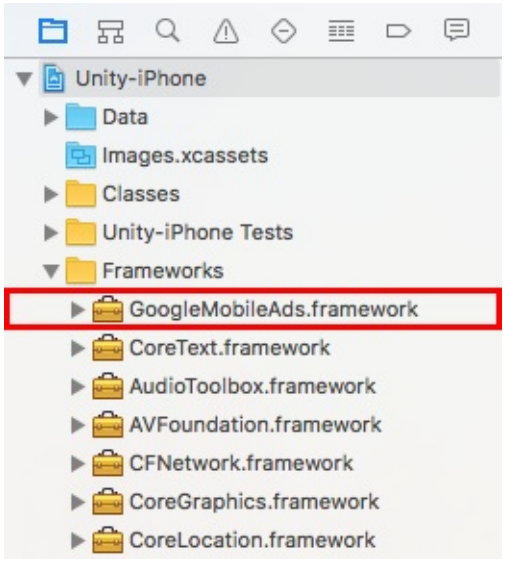
[iOS] Import GoogleMobileAds framework in Xcode

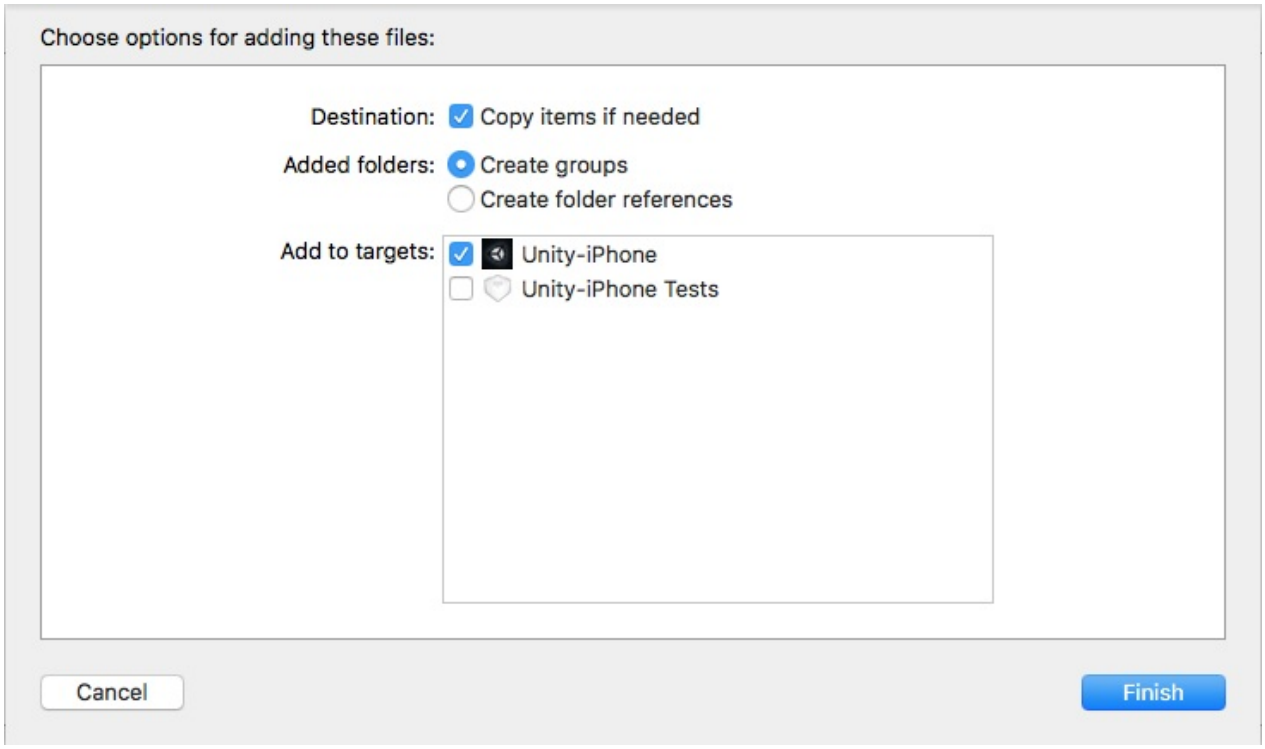
For Google Mobile Ads plugin version 3.1.0 or newer

Since version 3.1.0, the Google Mobile Ads plugin for Unity has removed the CocoaPods integration, therefore after creating an iOS build in Unity, you need to manually import the GoogleMobileAds framework for iOS to the generated Xcode project, or it will fail to build due to file missing. Please follow the following steps to import this required framework to your Xcode project.

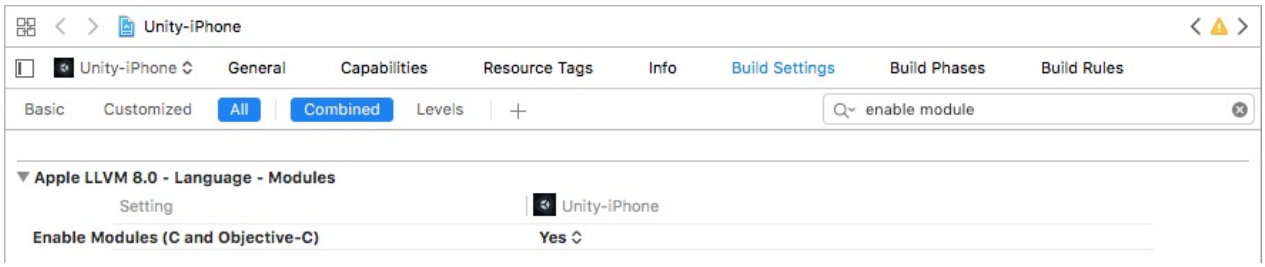
First you need to download the GoogleMobileAds framework from https://firebase.google.com/docs/admob/ios/download

Next, unzip the downloaded file, and drag the **GoogleMobileAds.framework** to the *Frameworks* folder in your Xcode project. Also check the "Copy items if needed" option in the import dialog.

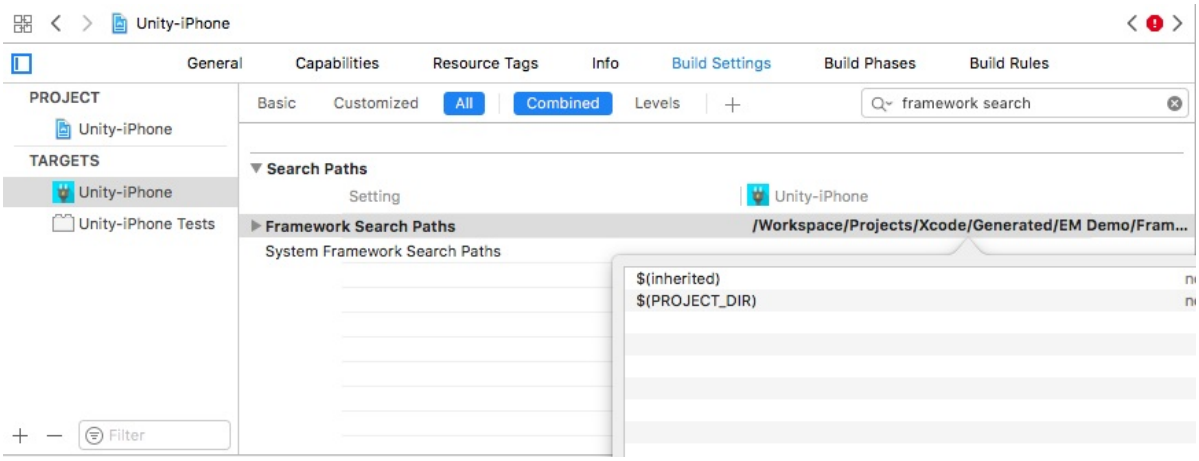




Lastly, select the Unity-iPhone project in the project navigator, then select the Unity-iPhone target in the **TARGETS** list, open *Build Settings* tab and set the **Enable Modules (C and Objective-C)** option to **Yes**.



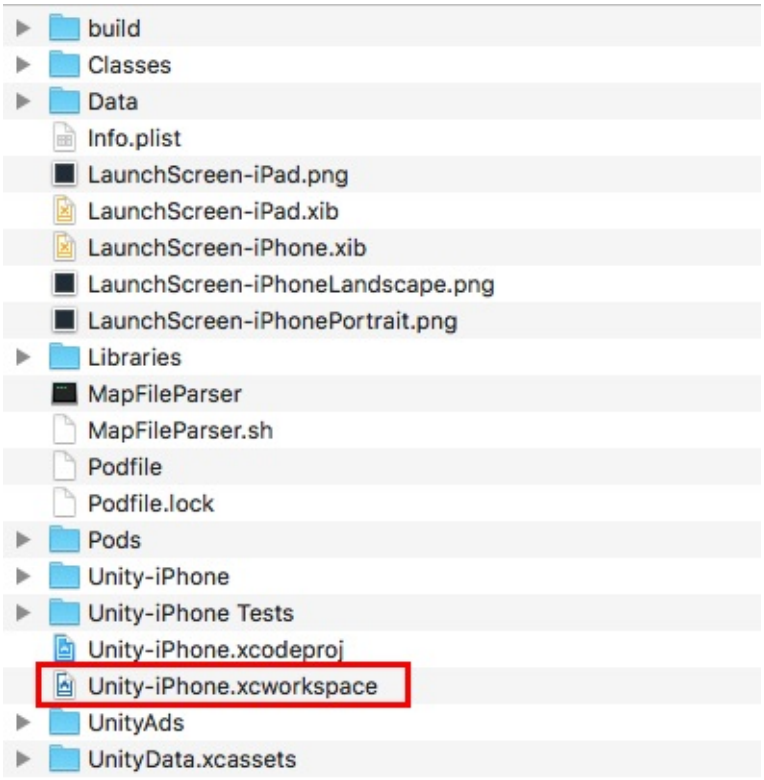
> Note that if you select **Replace** in a subsequent iOS build in Unity, you'll need to repeat the above process to import the GoogleMobileAds framework again.
>
> If you select **Append**, you don't need to reimport the framework. However, you may get the error **"Module 'GoogleMobileAds' not found"** when building in Xcode, which you can fix by adding **$(PROJECT_DIR)** to the **Framework Search Paths** key in *Build Settings*.



For Google Mobile Ads plugin versions older than 3.1.0

Before version 3.1.0, the Google Mobile Ads plugin for Unity employs CocoaPods to automatically import the GoogleMobileAds framework to the generated Xcode project when an iOS build is performed in Unity. Therefore you need to install CocoaPods to your Mac if you intend to use a pre-3.1.0 version of the Google Mobile Ads plugin. Please go to https://cocoapods.org/ for install instructions, as well as for more information about CocoaPods. Note that you only need to install CocoaPods, everything else will be done automatically by the Google Mobile Ads plugin.

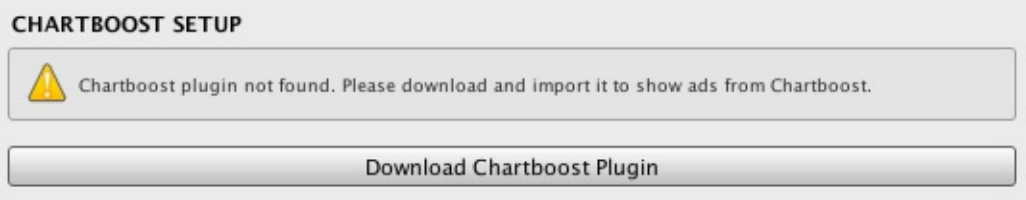
> When building for iOS in Unity, CocoaPods will automatically create an Xcode workspace (with .xcworkspace extension) in the generated Xcode project. You should always open this workspace instead of the normal project file (with .xcodeproj extension).



Chartboost

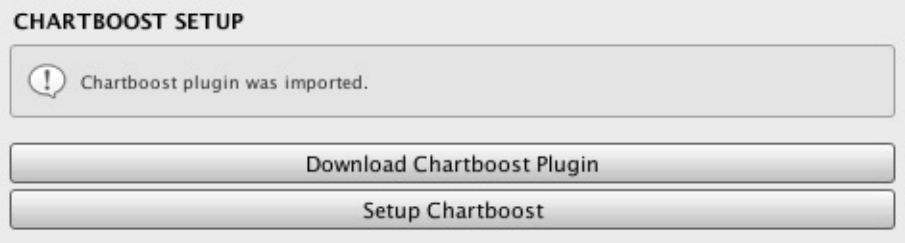
Import Chartboost Plugin

To show ads from Chartboost you need to import the Chartboost plugin for Unity. In the **CHARTBOOST SETUP** section, click the *Download Chartboost Plugin* button to open the download page. Download the plugin and import it to your project.

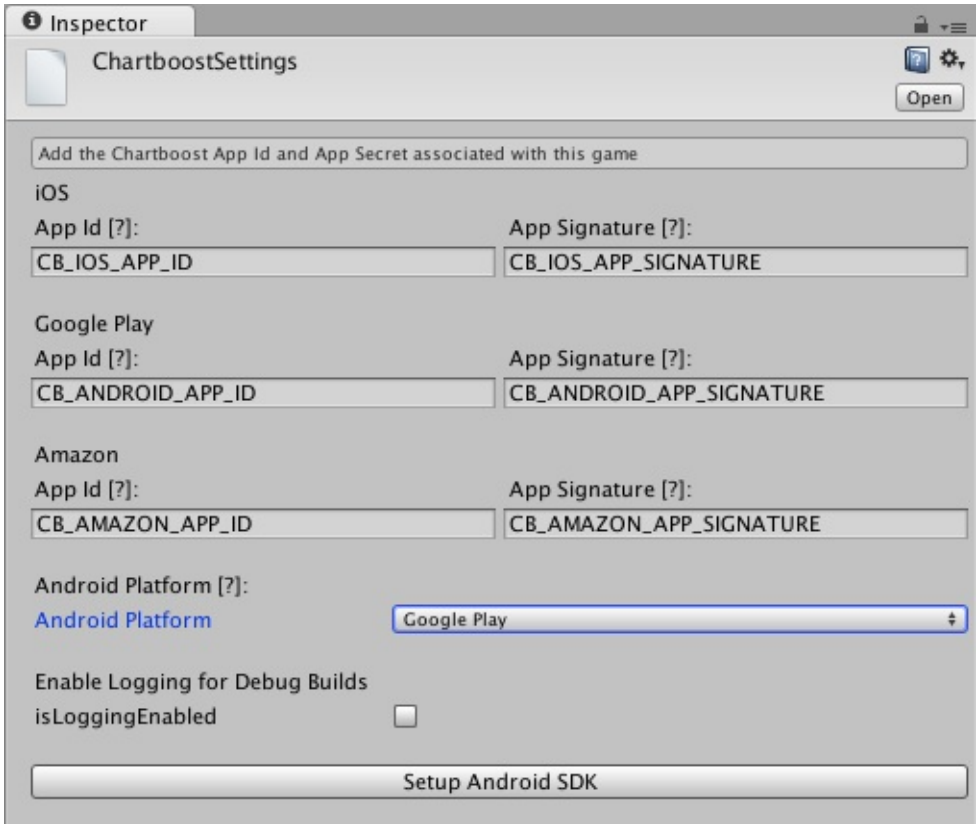


Configure Chartboost

After importing Chartboost plugin, the **CHARTBOOST SETUP** section will be updated as below.

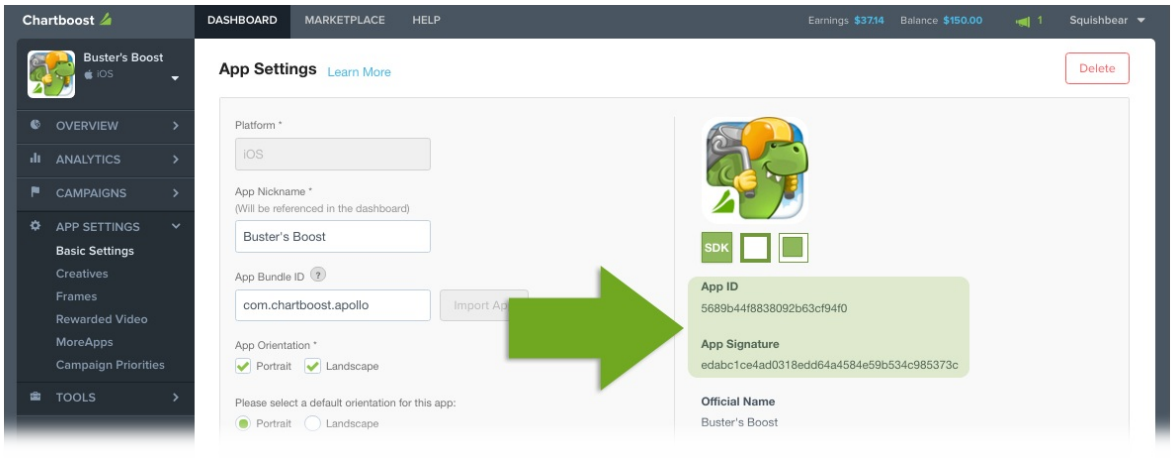


Click the *Setup Chartboost* button to open Chartboost' s settings tool.



Provide the App IDs and App Signatures for your targeted platforms. Remember to click the *Setup Android SDK* button if you're building for Android.

> To obtain the App Id and App Signature you need to add your app to the Chartboost dashboard. If you're not familiar with the process please follow the instructions here.
>
> After adding the app, go to APP SETTINGS > Basic Settings to find its App ID and App Signature.



READ_PHONE_STATE permission on Android

The Chartboost SDK includes the READ_PHONE_STATE permission on Android, to "handle video playback when interrupted by a call", as stated in its manifest. READ_PHONE_STATE permission requires your app to have a privacy policy when uploaded to Google Play. Since this permission is not mandatory to run the Chartboost SDK, you can safely remove it if you are not ready to provide the required privacy policy. To remove the permission, open the AndroidManifest.xml file located at *Assets/Plugins/Android/ChartboostSDK* folder, then delete the corresponding line (or comment it out as below).

```
<!-- Exclude the READ_PHONE_STATE permission because it requires a privacy policy -->
<!-- <uses-permission android:name="android.permission.android.permission.READ_PHONE_S
TATE" /> -->
```

Testing Notes

Please note that to show ads from Chartboost you need to either create a publishing campaign or enable the Test Mode for your app.

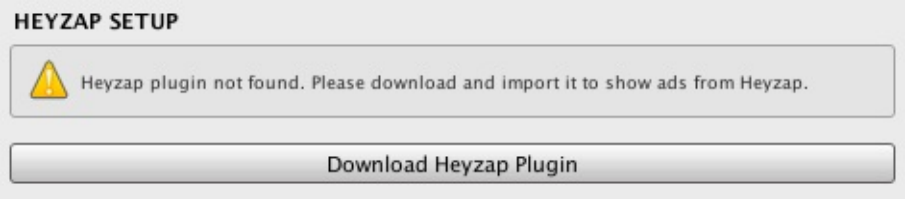
- To create a publishing campaign follow the instructions here
- To enable Test Mode follow the instruction here

Heyzap

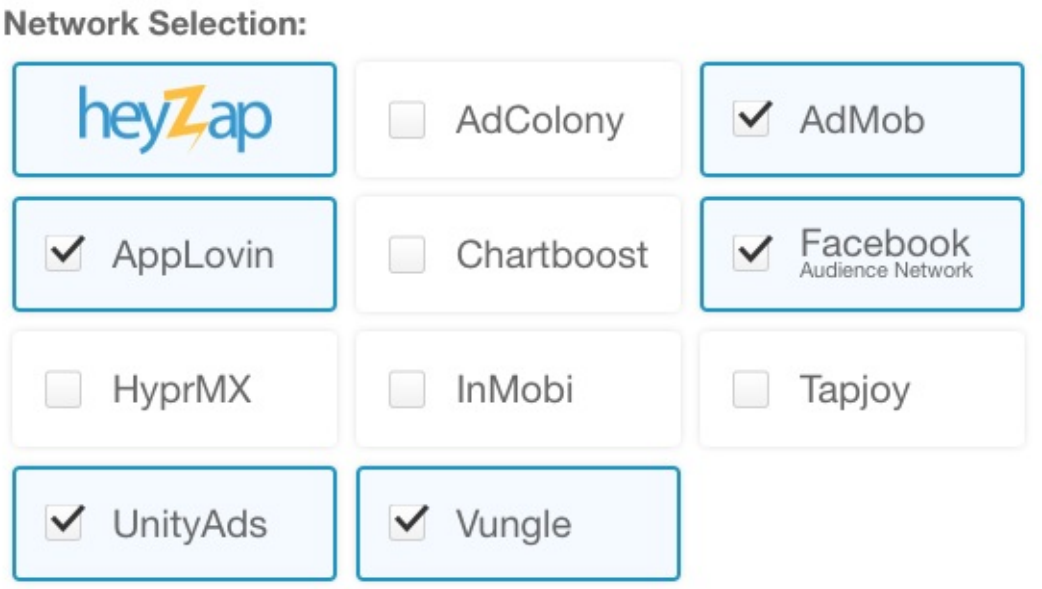
> As mentioned earlier, if you use Heyzap's mediation with other networks (AdColony, AdMob, Chartboost, etc.), you should not import the standalone-plugins of those networks, to avoid potential conflicts. Instead, import their corresponding packages provided at the Heyzap download page.

Import Heyzap Plugin

To show ads from Heyzap you need to import the Heyzap plugin for Unity. In the **HEYZAP SETUP** section, click the *Download Heyzap Plugin* button to open the download page.



In the download page select your preferred networks to use with Heyzap mediation. The Heyzap dynamic documentation will update automatically to reflect your selections.

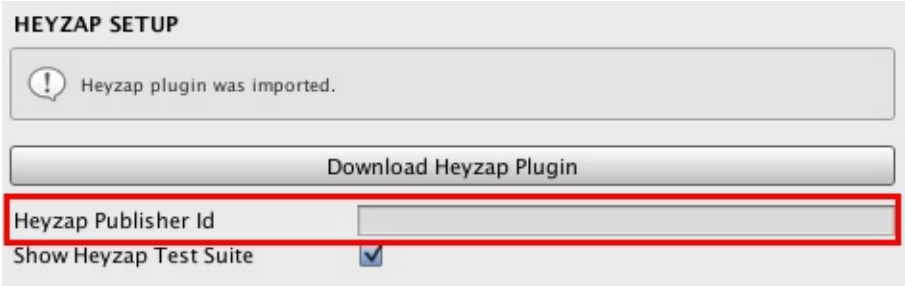


Follow the instructions provided by Heyzap to download and import its plugin as well as other required 3rd-party plugins. Also go through the **Integration Notes** section below to avoid problems that may occur during the integration of 3rd-party networks.

> If you haven't already, use Heyzap's Integration Wizard to setup the 3rd-party networks to use with mediation.

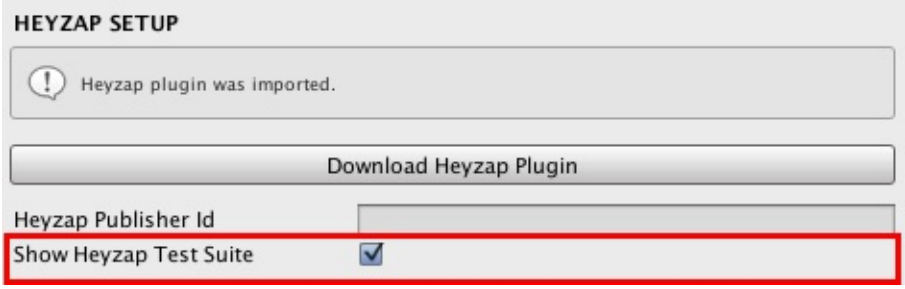
Configure Heyzap

After importing Heyzap plugin, the **HEYZAP SETUP** section will be updated as below. You can now enter your publisher Id to the *Heyzap Publisher Id* field.

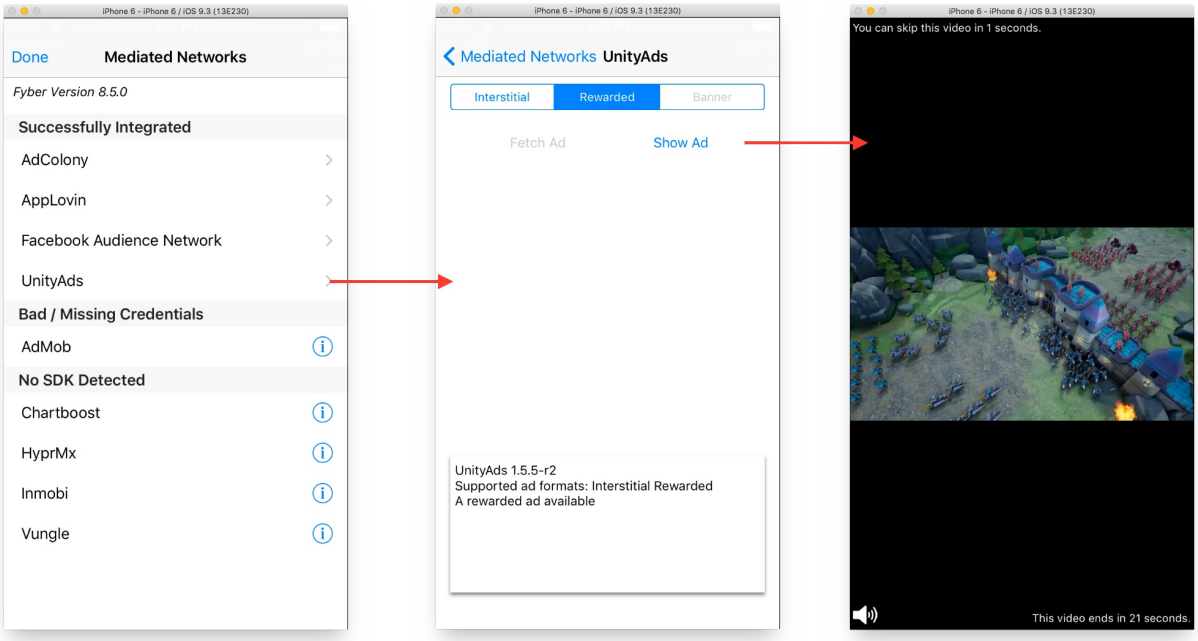


Heyzap Mediation Test Suite

The Heyzap plugin comes with a convenient Test Suite that you can use to test each of the networks you selected for mediation. To use this Test Suite, simply check the *Show Heyzap Test Suite* option in the **HEYZAP SETUP** section.



Below is the Test Suite interface on iOS.



Integration Notes

This section discusses some notes that you should take when using Heyzap mediation with various other networks.

Facebook Audience Network (Android-specific)

The Facebook Audience Network package contains an *android-support-v4.jar _file under Assets/Plugins/Android* folder. If you project already contains a *support-v4-xx.x.x.aar* file under that same folder, feel free to remove (or exclude it when importing) the jar file or it will cause the "Unable to convert dex..." error when building due to duplicate libraries.

AppLovin (Android-specific)

As instructed in the Heyzap documentation, you need to add the AppLovin SDK key to its AndroidManifest.xml file located at *Assets/Plugins/Android/AppLovin* folder. Simply add the following line inside the <application> tag in the manifest, replacing YOUR_SDK_KEY with your actual AppLovin SDK key.

```
<meta-data android:name="applovin.sdk.key" android:value="YOUR_SDK_KEY"/>
```

This manifest also includes the READ_PHONE_STATE permission, which requires your app to have a privacy policy when uploaded to Google Play. This permission is not mandatory to run the AppLovin SDK, therefore you can safely remove it if you are not ready to provide the required privacy policy. To remove the permission, simply delete the corresponding line from the manifest or comment it out as below.

```
<!-- Exclude the READ_PHONE_STATE permission because it requires a privacy policy -->
<!-- <uses-permission android:name="android.permission.READ_PHONE_STATE" /> -->
```

The minSdkVersion Problem (Android-specific)

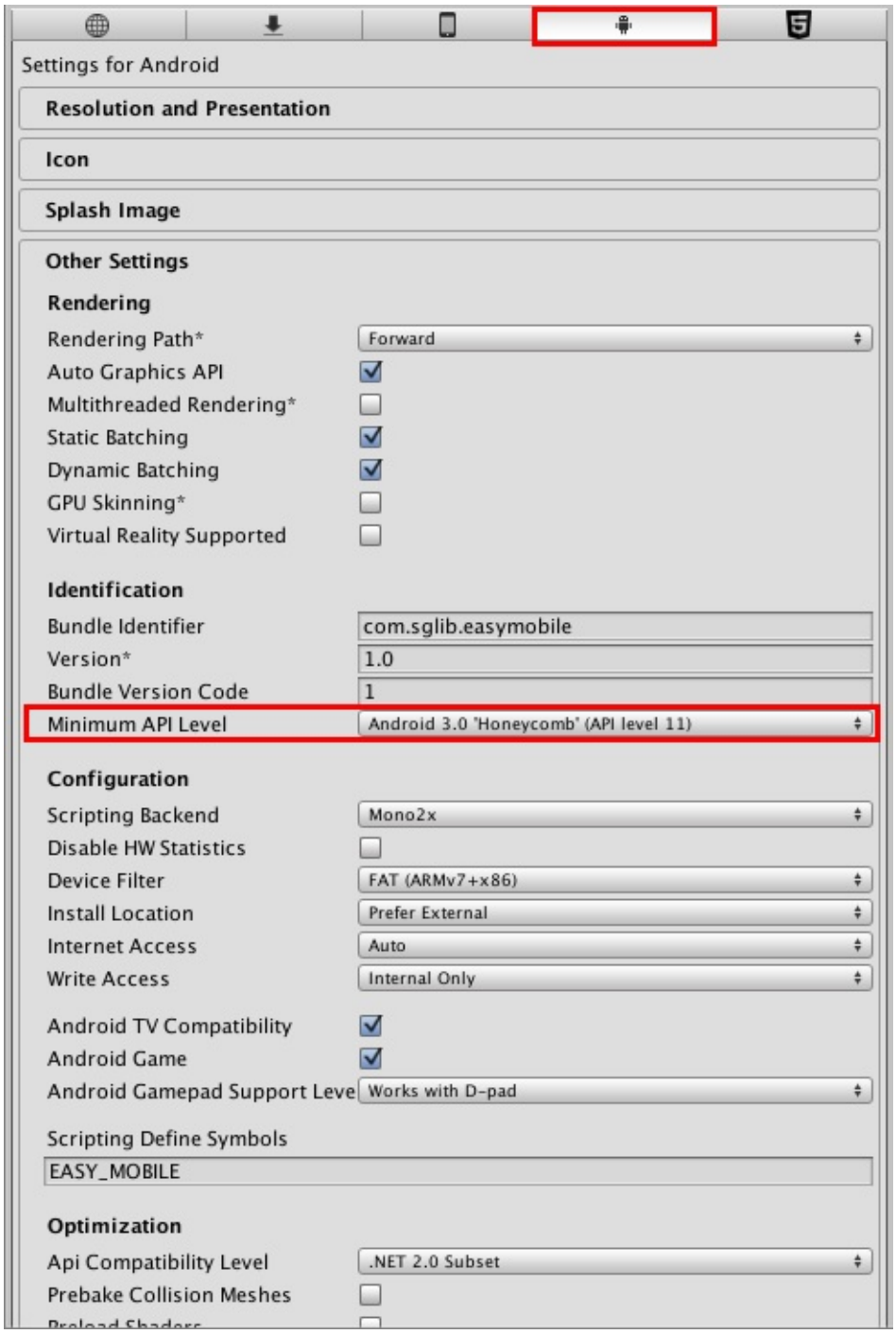
The current Heyzap SDK requires a minSdkVersion of 10, while some other 3rd-party plugins may require a version of 11 or above. If you get a build error including this line

```
Unable to merge android manifests...
```

and this line

```
Main manifest has <uses-sdk android:minSdkVersion='x'> but library uses minSdkVersion=
'y'
```

where x < y, it means you need to increase the minSdkVersion of the app. To do so go to *Edit > Project Settings > Player*, then select the *Android settings* tab and increase its *Minimum API Level* to the required one (which is 'y' in this example).

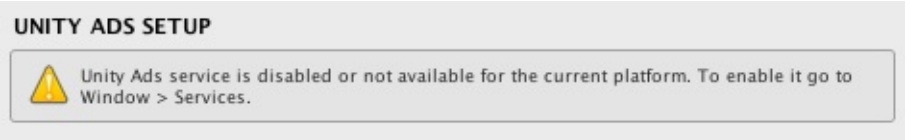


Unity Ads

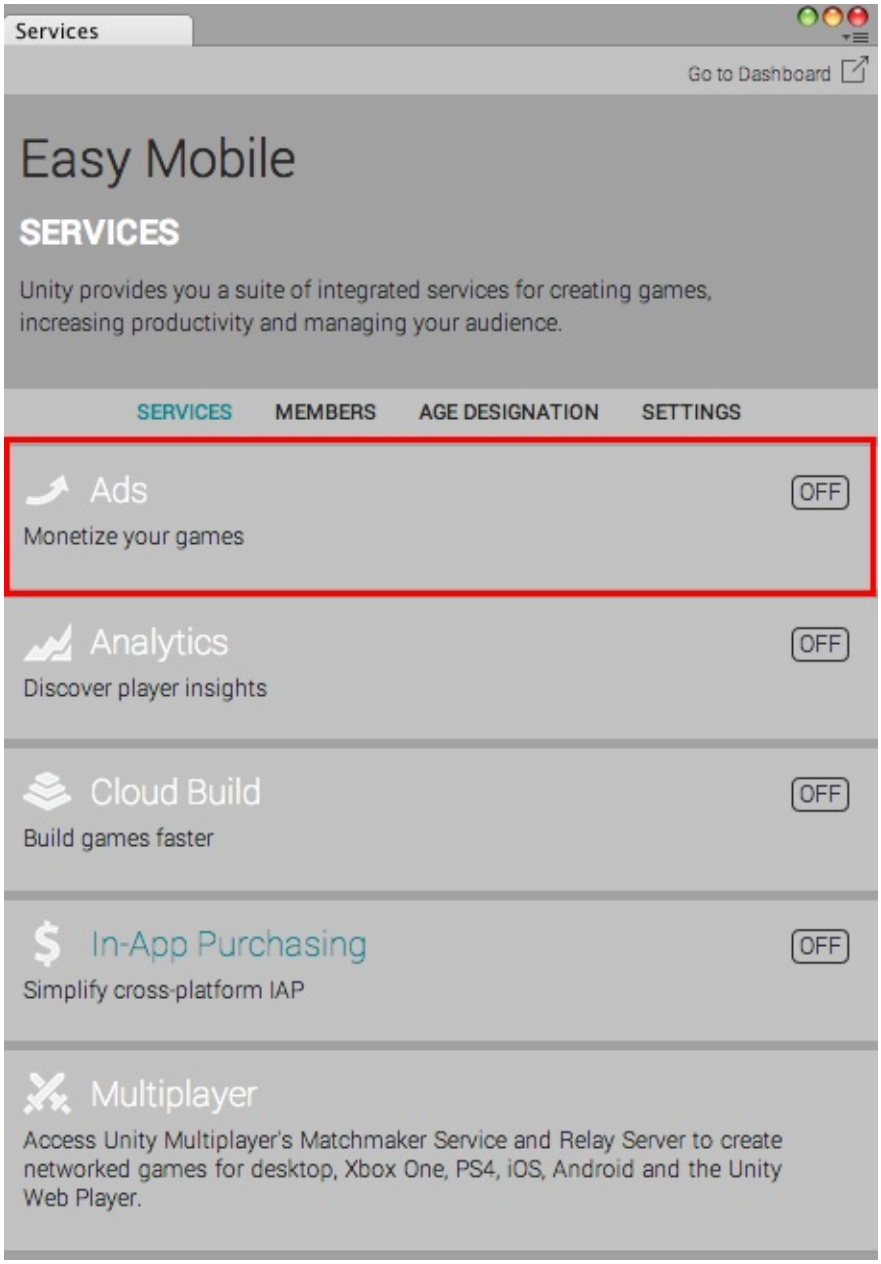
Enable Unity Ads Service

> To use Unity Ads service, you must first set up your project for Unity Services.

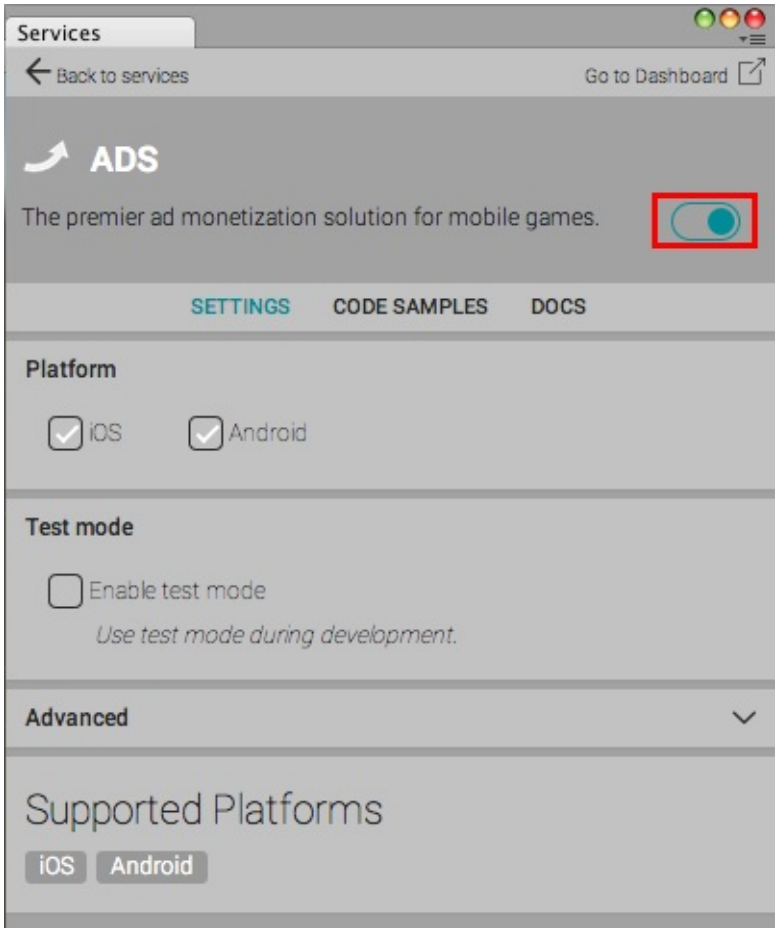
To show ads from Unity Ads you need to enable the corresponding service. Easy Mobile will automatically check for the service's availability and warn you to enable it if needed. Below is the **UNITY ADS SETUP** section when Unity Ads is not enabled.



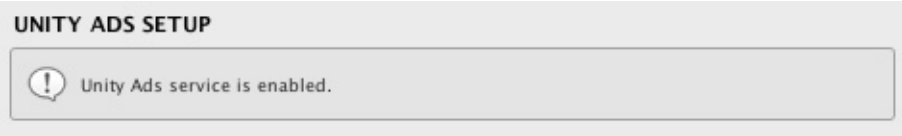
To enable Unity Ads switch the platform to iOS or Android, then go to *Window* > *Services* and select the Ads tab.



In the opened configuration window, click the toggle at the right-hand side to enable Unity Ads service. You may need to answer a few questions about your game.



The **UNITY ADS SETUP** section will be updated after Unity Ads has been enabled.



Testing Notes

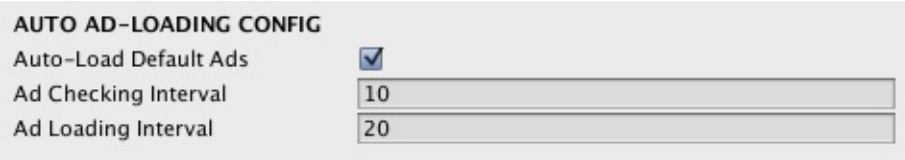
It is advisable to enable the test mode of Unity Ads during development. This will ensure there's always an ad returned whenever requested. To enable test mode simple check the *Enable test mode* option within the Ads configuration window.

> Remember to disable this test mode when creating your release build.

Automatic Ad Loading

Automatic ad loading is a feature of the Advertising module. It regularly checks for the availability of default ads, and performs loading if needed, to make sure that ads are always ready when they need to be shown. You can configure this feature in the **AUTO AD-LOADING CONFIG** section.

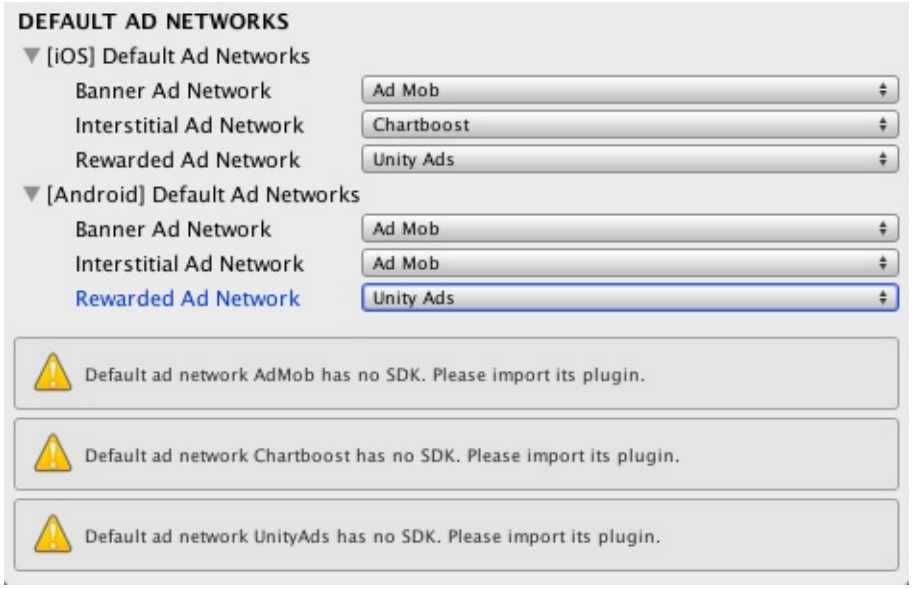
> Default ads are ads loaded from default networks, see Default Ad Networks section.



- *Auto-Load Default Ads*: uncheck this to disable automatic ad loading feature, you can load ads manually from script, see **Scripting** section for instructions on this
- *Ad Checking Interval*: change this value to determine how frequently the module should perform ads availability check, the smaller the more frequently
- *Ad Loading Interval*: the minimum time between two ad loading requests

Default Ad Networks

You can select default ad networks for each platform in the **DEFAULT AD NETWORKS** section. You can have different networks for different ad types and different selections for different platforms. If you don't want to use a certain type of ad, simply set its network to *None*.



> Pay attention to the warnings and import the required plugins if you haven't already.

Scripting

This section provides a guide to work with the Advertising API using the default ad networks configured in the module settings.

> You can access all the Advertising API methods via the AdManager class under the EasyMobile namespace.

Banner Ads

To show a banner ad you need to specify its position using the *BannerAdPosition* enum. The banner will be displayed once it is loaded.

```
// Show banner ad
AdManager.ShowBannerAd(BannerAdPosition.Bottom);
```

To hide the current banner ad (it can be shown again later):

```
// Hide banner ad
AdManager.HideBannerAd();
```

To destroy the current banner ad (a new one will be created on the next banner ad showing):

```
// Destroy banner ad
AdManager.DestroyBannerAd();
```

You can also check if a banner ad is being shown:

```
// Check if banner ad is being shown
bool isShowingBanner = AdManager.IsShowingBannerAd();
```

Interstitial Ads

The method to show an interstial ad requires it to be already loaded. Therefore you should check for the ad's availability before showing it.

```
// Check if interstitial ad is ready
bool isReady = AdManager.IsInterstitialAdReady();

// Show it if it's ready
if (isReady)
{
    AdManager.ShowInterstitialAd();
}
```

An *InterstitialAdCompleted* event will be fired whenever an interstitial ad is closed. You can listen to this event to take appropriate actions, e.g. resume the game.

```
// Subscribe to the event
void OnEnable()
{
    AdManager.InterstitialAdCompleted += InterstitialAdCompletedHandler;
}

// The event handler
void InterstitialAdCompletedHandler(InterstitialAdNetwork network, AdLocation location
)
{
    Debug.Log("Interstitial ad has been closed.");
}

// Unsubscribe
void OnDisable()
{
    AdManager.InterstitialAdCompleted -= InterstitialAdCompletedHandler;
}
```

Rewarded Ads

The method to show a rewarded ad requires it to be already loaded. Therefore you should check for the ad's availability before showing it.

```
// Check if rewarded ad is ready
bool isReady = AdManager.IsRewardedAdReady();

// Show it if it's ready
if (isReady)
{
    AdManager.ShowRewardedAd();
}
```

A *RewardedAdCompleted* event will be fired whenever a rewarded ad has completed. You should listen to this event to reward the user for watching the ad.

```
// Subscribe to the event
void OnEnable()
{
    AdManager.RewardedAdCompleted += RewardedAdCompletedHandler;
}

// The event handler
void RewardedAdCompletedHandler(RewardedAdNetwork network, AdLocation location)
{
    Debug.Log("Rewarded ad has completed. The user should be rewarded now.");
}

// Unsubscribe
void OnDisable()
{
    AdManager.RewardedAdCompleted -= RewardedAdCompletedHandler;
}
```

Remove Ads

In some cases you need to remove/stop showing ads in your game, e.g. when the user purchases the "Remove Ads" product. To remove ads:

```
// Remove ads permanently
AdManager.RemoveAds();
```

The *RemoveAds* method will destroy the banner ad if one is being shown, and prevent future ads from being loaded and shown except rewarded ads.

> Rewarded ads can still be shown after ads were removed since they are unobtrusive and only shown at the user discretion.

An *AdsRemoved* event will be fired after ads have been removed. You can listen to this event and take appropriate actions, e.g update the UI.

```
// Subscribe to the event
void OnEnable()
{
    AdManager.AdsRemoved += AdsRemovedHandler;
}

// The event handler
void AdsRemovedHandler()
{
    Debug.Log("Ads were removed.");

    // Unsubscribe
    AdManager.AdsRemoved -= AdsRemovedHandler;
}
```

You can also check at any time if ads were removed or not.

```
// Determine if ads were removed
bool isRemoved = AdManager.IsAdRemoved();
```

Finally, you can also revoke the ad removing status and allow ads to be shown again.

```
// Revoke ad removing status and allow showing ads again
AdManager.ResetRemoveAds();
```

Manual Ad Loading

Normally you don't need to worry about loading ads if the automatic ad loading feature is enabled (see **Configure Advertising Module** section). Otherwise, if you choose to disable this feature, you can load ads manually from script.

> It is advisable to load an ad as far in advance of showing it as possible to allow time for the ad to be loaded.

To load an interstitial ad:

```
// Load an interstitial ad
AdManager.LoadInterstitialAd();
```

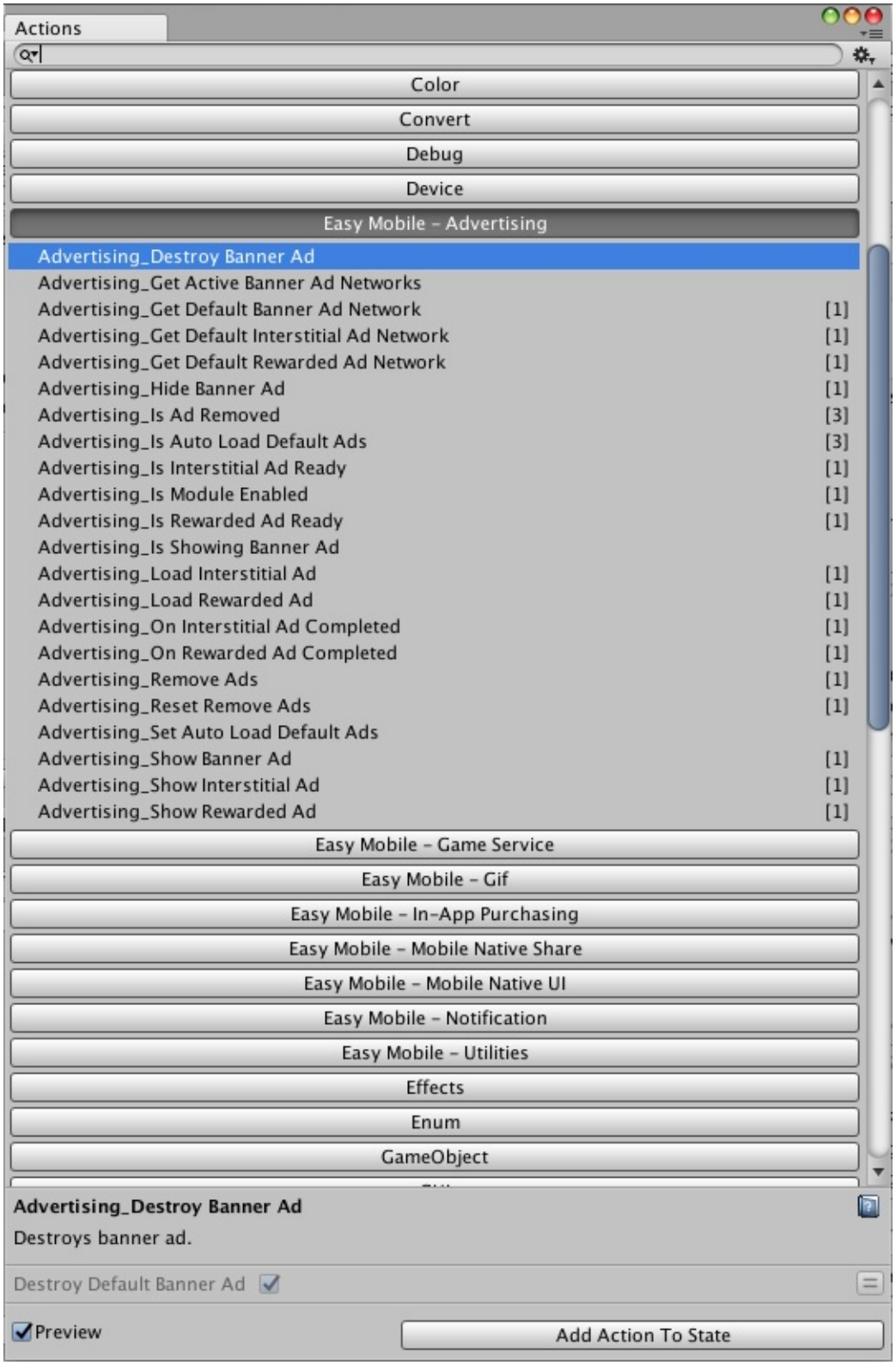
To load a rewarded ad:

```
// Load a rewarded ad
AdManager.LoadRewardedAd();
```

PlayMaker Actions

The PlayMaker actions of the Advertising module are group in the category *Easy Mobile - Advertising* in the PlayMaker's Action Browser.

> Please refer to the AdvertisingDemo_PlayMaker scene in folder *Assets/EasyMobile/Demo/PlayMakerDemo/Modules* for an example on how these actions can be used.


Actions
Color
Convert
Debug
Device
Easy Mobile - Advertising
Advertising_Destroy Banner Ad
Advertising_Get Active Banner Ad Networks
Advertising_Get Default Banner Ad Network [1]
Advertising_Get Default Interstitial Ad Network [1]
Advertising_Get Default Rewarded Ad Network [1]
Advertising_Hide Banner Ad [1]
Advertising_Is Ad Removed [3]
Advertising_Is Auto Load Default Ads [3]
Advertising_Is Interstitial Ad Ready [1]
Advertising_Is Module Enabled [1]
Advertising_Is Rewarded Ad Ready [1]
Advertising_Is Showing Banner Ad
Advertising_Load Interstitial Ad [1]
Advertising_Load Rewarded Ad [1]
Advertising_On Interstitial Ad Completed [1]
Advertising_On Rewarded Ad Completed [1]
Advertising_Remove Ads [1]
Advertising_Reset Remove Ads [1]
Advertising_Set Auto Load Default Ads
Advertising_Show Banner Ad [1]
Advertising_Show Interstitial Ad [1]
Advertising_Show Rewarded Ad [1]
Easy Mobile - Game Service
Easy Mobile - Gif
Easy Mobile - In-App Purchasing
Easy Mobile - Mobile Native Share
Easy Mobile - Mobile Native UI
Easy Mobile - Notification
Easy Mobile - Utilities
Effects
Enum
GameObject
Advertising_Destroy Banner Ad
Destroys banner ad.
Destroy Default Banner Ad
Preview
Add Action To State

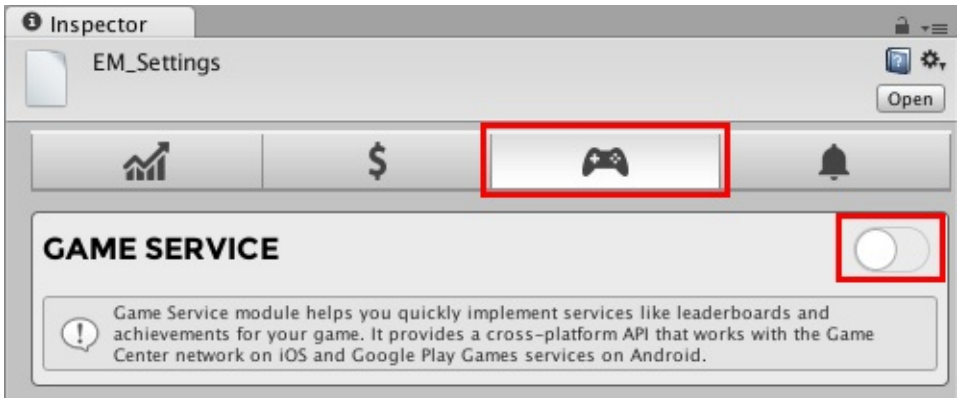
Game Service

The Game Service module helps you quickly implement leaderboards and achievements for your game. It works with the Game Center network on iOS and Google Play Games services on Android. Here're some highlights of this module:

- **Leverages official plugins**
  - This module is built on top of Unity's GameCenterPlatform on iOS and Google Play Games plugin on Android
  - GameCenterPlatform is one part of the UnityEngine itself while the other is the official Google Play Games plugin for Unity, so reliability and compatibility can be expected
- **Easy management of leaderboards and achievements**
  - Easy Mobile's custom editor features a friendly interface that help you easily add, edit or remove leaderboards and achievements

Module Configuration

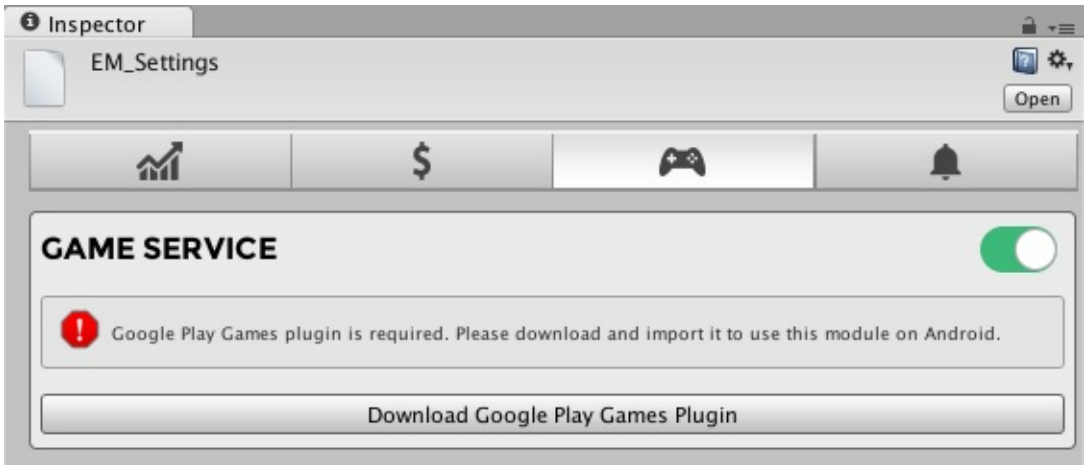
To use the Game Service module you must first enable it. Go to *Window* > *Easy Mobile* > *Settings*, select the Game Service tab, then click the right-hand side toggle to enable and start configuring the module.



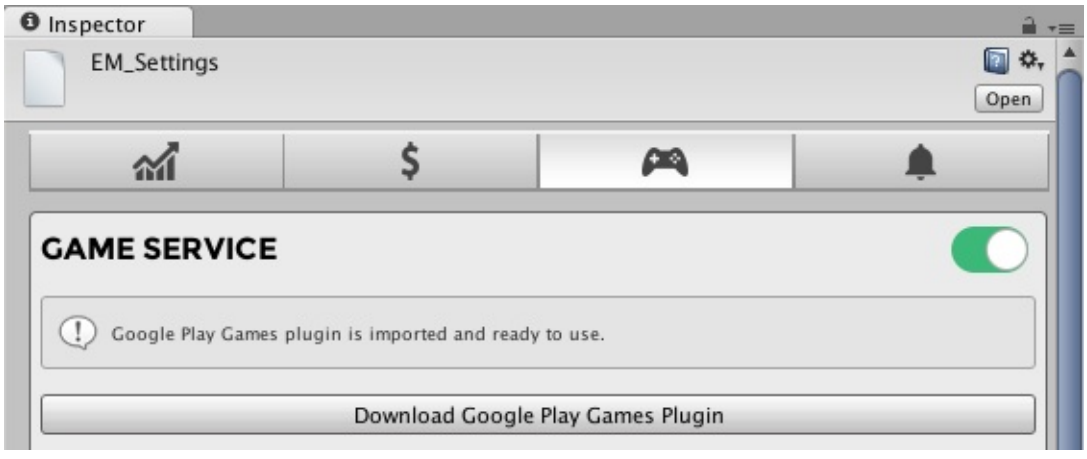
Android-Specific Setup

Import Google Play Games plugin for Unity

As stated earlier, this module is built on top of Google Play Games Plugin on Android. Therefore you need to import it to use the module on this platform. Easy Mobile will automatically detect the availability of the plugin and prompt you to import it if needed. Below is the module settings interface on Android platform when Google Play Games plugin hasn't been imported.



Click the *Download Google Play Games Plugin* button to open the download page, then download the package and import it to your project. Once the import completes the module interface will be updated and ready for you to start with the configuration.



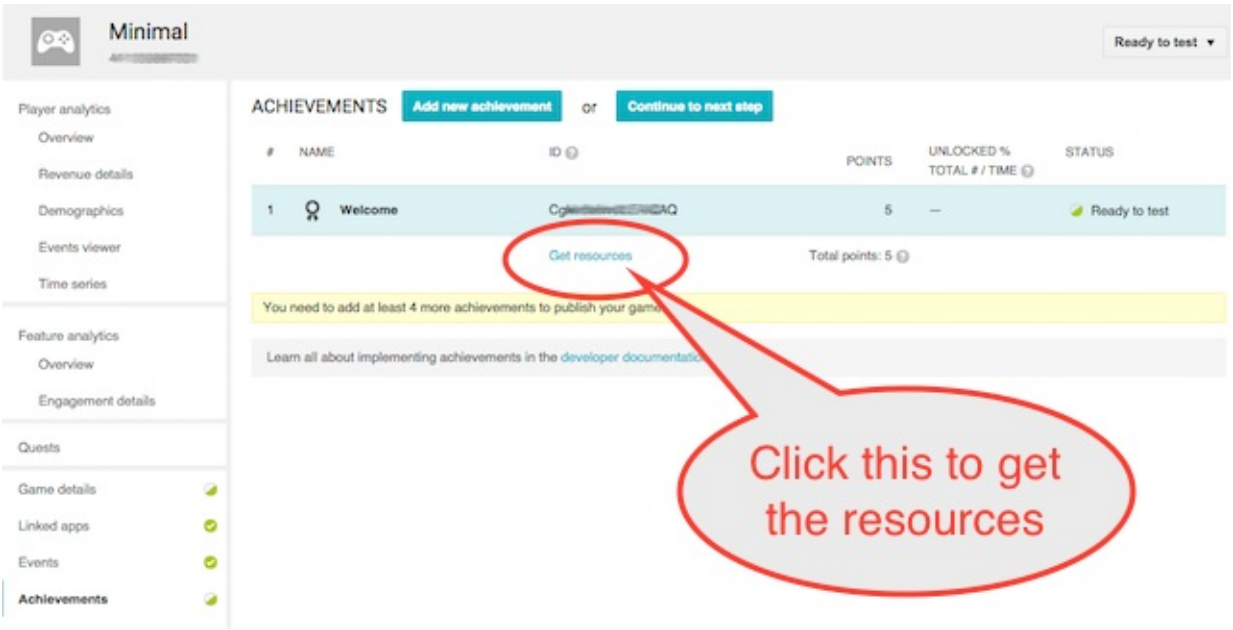
> Since we're not using Google Play Games plugin on iOS, the NO_GPGS symbol will be defined for iOS platform automatically after the plugin is imported in order to disable it.

Setup Google Play Games

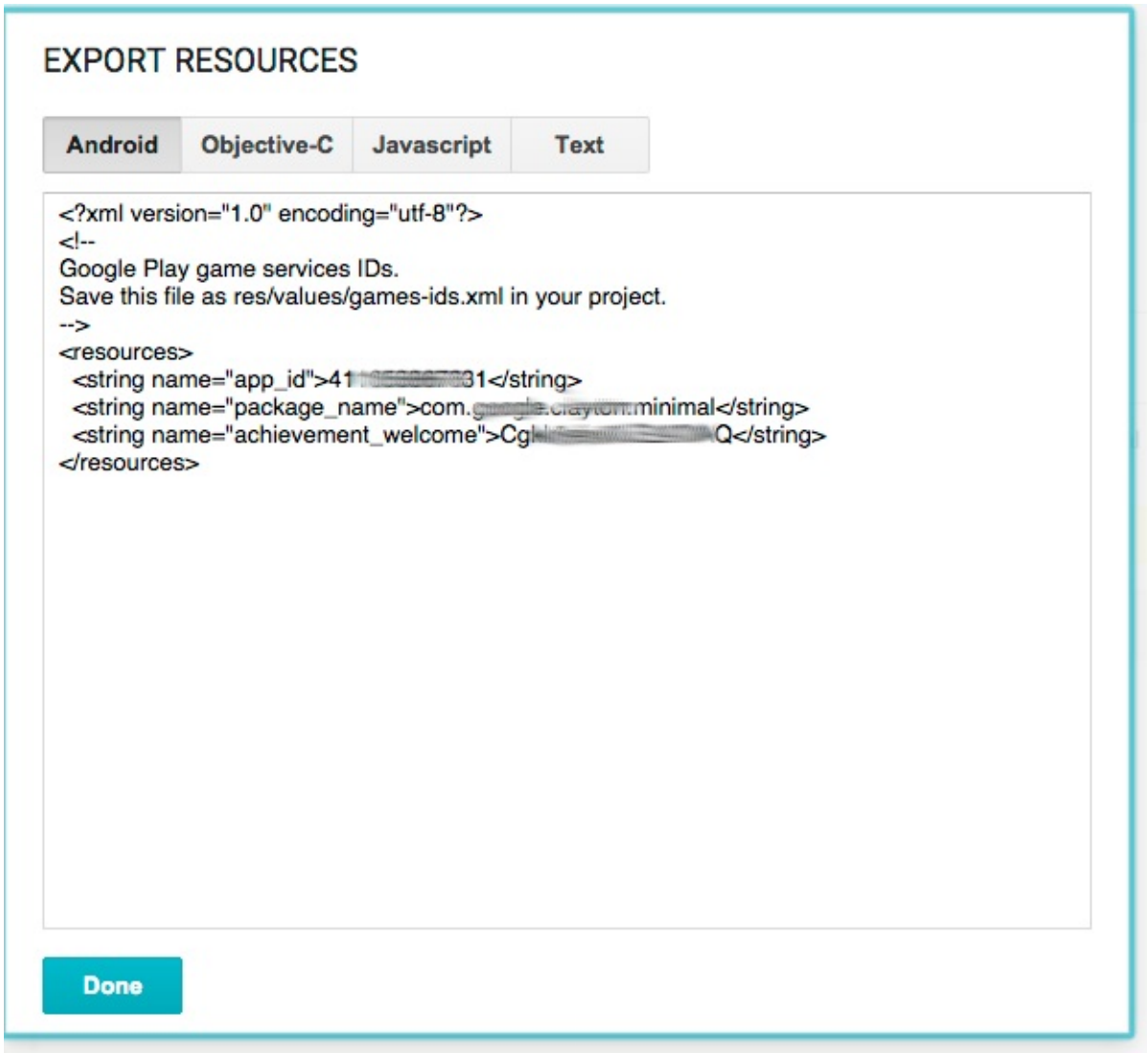
To setup Google Play Games plugin, you need to obtain the game resources from the Google Play Developer Console.

> The game resources are available after you configured your game on the Google Play Developer Console. If you're not familiar with the process, please follow the instructions on creating a client ID, as well as leaderboards and achievements.

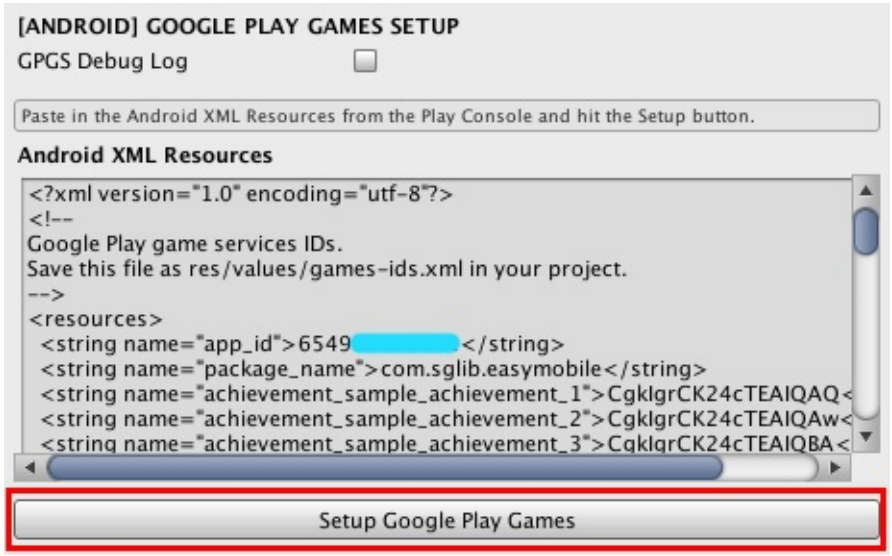
To get the game resources, login to your Google Play Developer Console, select *Game services* tabs then select your game. Next go to the *Achievements* tab and click on the *Get Resources* label at the bottom of the list.



Copy all the xml content from the *Android* tab.



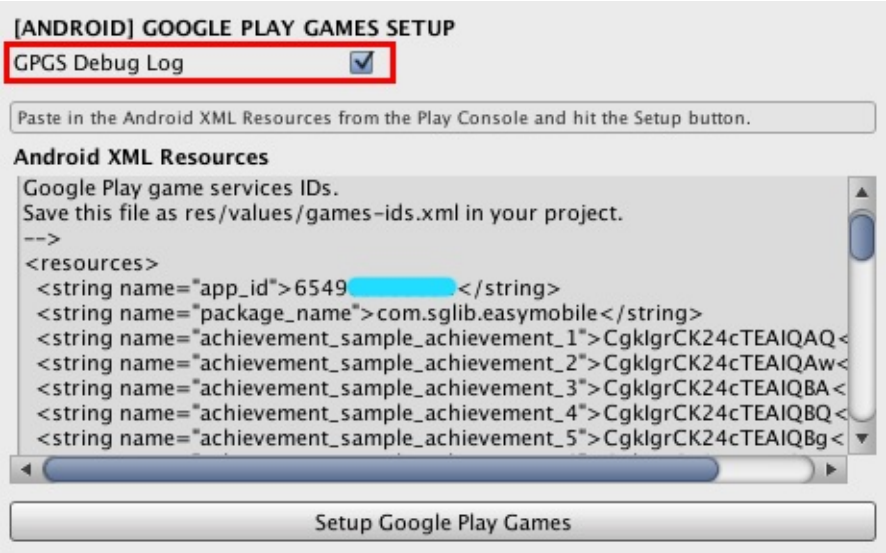
Go back to Unity, in the **[ANDROID] GOOGLE PLAY GAMES SETUP** section, paste the obtained xml resouces into the **Android XML Resources** area, then click *Setup Google Play Games*.



After the setup has completed, a new file named EM_GPGSIds will be created at *Assets/EasyMobile/Generated*. This file contains the constants of the IDs of all the leaderboards and achievements in your Android game.

Enable Google Play Games Debug Log

To enable Google Play Games debug log, simply check the *GPGS Debug Log* option in the **[ANDROID] GOOGLE PLAY GAMES SETUP** section.



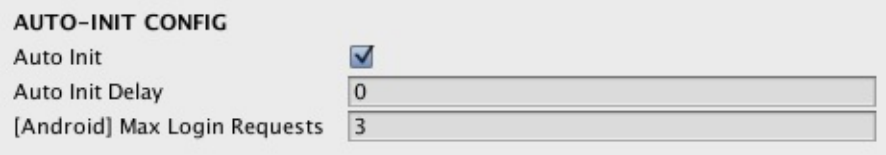
Auto Initialization

Auto initialization is a feature of the Game Service module that initializes the service automatically when the module starts. Initialization is required before any other actions can be done, e.g. reporting scores.

During the initialization, the system will try to authenticate the user by presenting a login popup.

- On iOS, this popup will show up when the app gets focus (brought to foreground) for the first 3 times. If the user refuses to login all these 3 times, the OS will ignore subsequent authentication calls and stop presenting the login popup (to avoid disturbing the user). Otherwise, if the user has logged in successfully, future authentication will take place silently with no login popup presented.
- On Android, we employ a similar approach but you can configure the maximum number of authentication requests before ignoring subsequent ones.

You can configure the auto initialization feature within the **AUTO-INIT CONFIG** section.



- *Auto Init*: uncheck this option to disable the auto initialization feature, you can start the initialization manually from script (see the **Scripting** section)
- *Auto Init Delay*: how long after the module start that the initialization should take place
- *[Android] Max Login Requests*: maximum number of authentication requests allowed on Android, before ignoring subsequent ones (in case the user refuses to login)

> "Module start" refers to the moment the *Start* method of the module's associated MonoBehavior (attached to the EasyMobile prefab) runs.

Leaderboards & Achievements

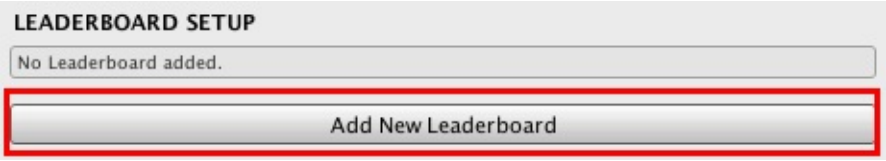
This section provides a guide to manage leaderboards and managements for your game.

> **Before You Begin**
>
> It is assumed that you already configured your game for the targeted gaming networks, i.e. Game Center and Google Play Games. If you're not familiar with the process, here're some useful links:
>
> - Configure for Google Play Games (Android)
> - Creating a Client ID for you game
> - Adding leaderboards
> - Adding achievements
> - Configure for Game Center (iOS)
> - Adding leaderboards and achievements in iTunes Connect

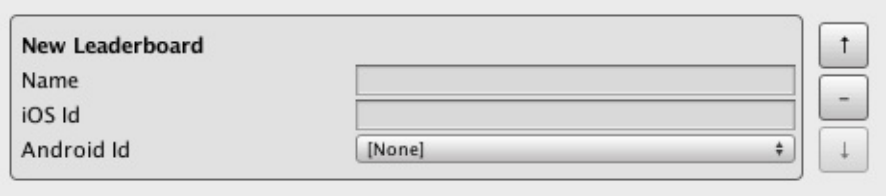
In the **LEADERBOARD SETUP** and **ACHIEVEMENT SETUP** you can add, edit or remove leaderboards and achievements.

Add a New Leaderboard or Achievement

To add a new leaderboard click the *Add New Leaderboard* button (or *Add New Achievement* button in case of an achievement).



A new empty leaderboard (or achievement) will be added.

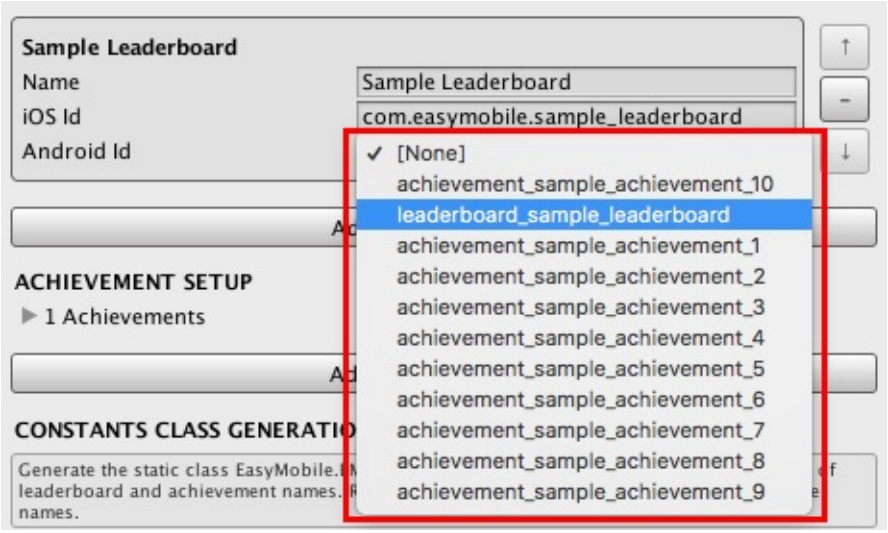


Fill in the required information of the leaderboard (or achievement):

- *Name*: the name of this leaderboard (or achievement), this name can be used when reporting scores to this leaderboard (or unlocking this achievement)
- *iOS Id*: the ID of this leaderboard (or achievement) as declared in iTunes Connect

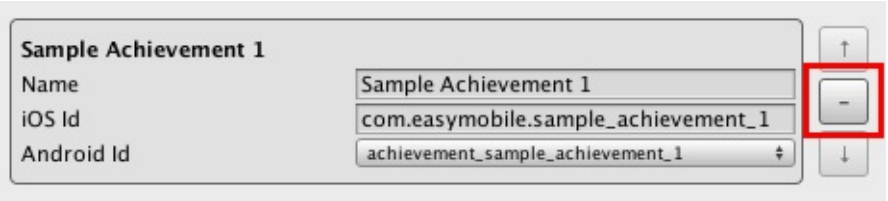
- *Android Id*: the ID of this leaderboard (or achievement) as declared in Google Play Developer Console

> Google Play Games' leaderboards and achievements have generated IDs which can be difficult to memorize and cumbersome to copy-and-paste, especially if there are many of them. Thankfully, when you setup Google Play Games, the constants of these IDs are generated automatically (remember that EM_GPGSIds file?), allowing Easy Mobile to show a nice dropdown of all defined leaderboard and achievement IDs for you to choose from.



Remove a Leaderboard or Achievement

To remove a leaderboard (or achievement), simply click the [-] button at the right hand side.



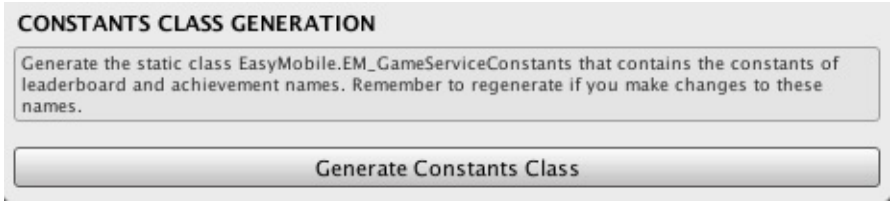
Arrange Leaderboards or Achievements

You can use the two arrow-up and arrow-down buttons to move a leaderboard (or achievement) upward or downward within its array.

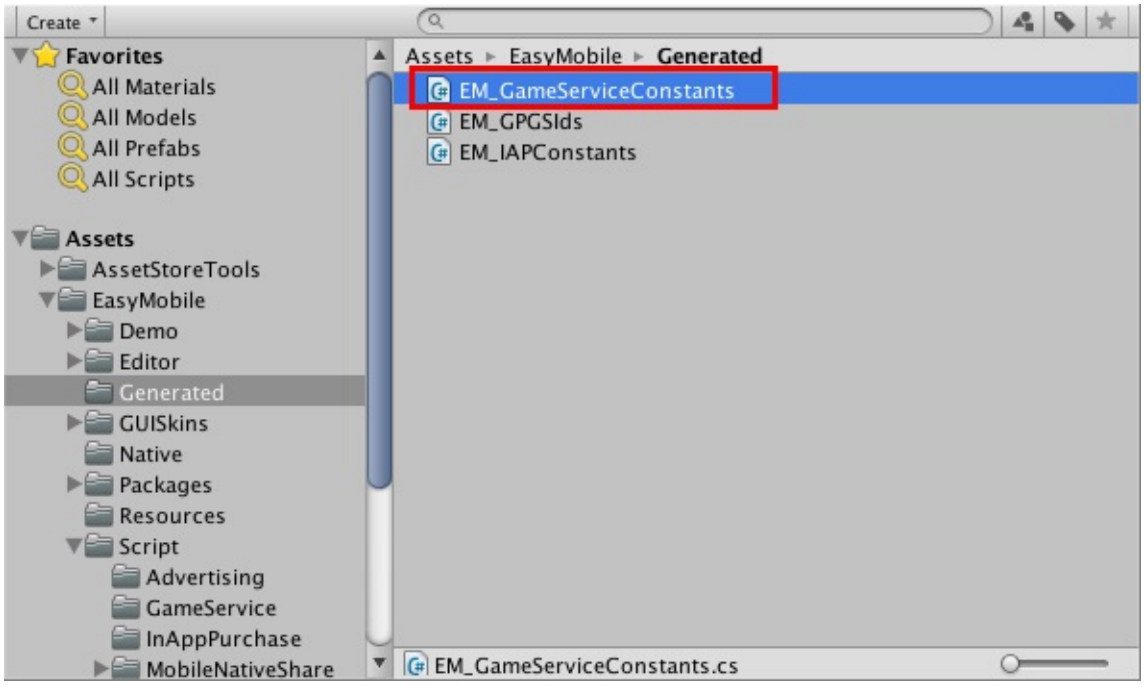
Game Service Constants Generation

Constants generation is a feature of the Game Service module. It reads the names of all the added leaderboards and achievements and generates a static class named EM_GameServiceConstants that contains the constants of these names. Later, you can use these constants when reporting scores to a leaderboard or unlocking an achievement in script instead of typing the names directly, thus help prevent runtime errors due to typos and the likes.

To generate the constants class (you should do this after adding all required leaderboards and achievements), click the *Generate Constants Class* button within the **CONSTANTS CLASS GENERATION** section.



When the process completes, a file named EM_GameServiceConstants will be created at *Assets/EasyMobile/Generated*.



Scripting

This section provides a guide to work with the Game Service API.

> You can access all the Game Service API methods via the GameServiceManager class under the EasyMobile namespace.

Initialization

Initialization is required before any other action, e.g. reporting scores, can be done. It should only be done once when the app is loaded. If you have enabled the Auto initialization feature, you don't need to initialize in script (see **Auto Initialization** section). Otherwise, if you choose to disable that feature, you can start the initialization in a couple of ways.

- Managed initialization: this method respects the *Max Login Requests* value on Android (see **Auto Initialization** section), which means it will ignore all subsequent calls once the user has dismissed the login popup for a number of time determined by *Max Login Requests*
- Unmanaged initialization: this method simply initializes the module, on Android it shows the login popup every time as long as the user hasn't been authenticated

> On iOS, the system automatically limits the maximum number of login requests to 3 no matter which method is used.

To use the managed initialization method:

```
// Managed init respects the Max Login Requests value
GameServiceManager.ManagedInit();
```

To use the unmanaged initialization method:

```
// Unmanaged init
GameServiceManager.Init();
```

Note that the initialization should be done early and only once, e.g. you can put it in the *Start* method of a MonoBehaviour, preferably a singleton one so that it won't run again when the scene reloads.

```
// Initialization in the Start method of a MonoBehaviour script
void Start()
{
    // Managed init respects the Max Login Requests value
    GameServiceManager.ManagedInit();

    // Do other stuff...
}
```

A *UserLoginSucceeded* event will be fired when the initialization completes and the user logins successfully. Otherwise, a *UserLoginFailed* event will be fired instead. You can optionally subscribe to these events and take appropriate actions depended on the user login status.

```
// Subscribe to events in the OnEnable method of a MonoBehavior script
void OnEnable()
{
    GameServiceManager.UserLoginSucceeded += OnUserLoginSucceeded;
    GameServiceManager.UserLoginFailed += OnUserLoginFailed;
}

// Unsubscribe
void OnDisable()
{
    GameServiceManager.UserLoginSucceeded -= OnUserLoginSucceeded;
    GameServiceManager.UserLoginFailed -= OnUserLoginFailed;
}

// Event handlers
void OnUserLoginSucceeded()
{
    Debug.Log("User logged in successfully.");
}

void OnUserLoginFailed()
{
    Debug.Log("User login failed.");
}
```

You can also check if the module has been initialized at any point using the *IsInitialized* method.

```
// Check if initialization has done (the user has been authenticated)
bool isInitialized = GameServiceManager.IsInitialized();
```

Leaderboards

This section focuses on working with leaderboards.

Show Leaderboard UI

To show the default leaderboard UI (the system view of leaderboards):

```
// Show leaderboard UI
GameServiceManager.ShowLeaderboardUI();
```

You should check if the initialization has finished (the user has been authenticated) before showing the leaderboard UI, and take appropriate actions if the user is not logged in, e.g. show an alert or start another initialization process.

```
// Check for initialization before showing leaderboard UI
if (GameServiceManager.IsInitialized())
{
    GameServiceManager.ShowLeaderboardUI();
}
else
{
    #if UNITY_ANDROID
    GameServiceManager.Init();    // start a new initialization process
    #elif UNITY_IOS
    Debug.Log("Cannot show leaderboard UI: The user is not logged in to Game Center.")
;
    #endif
}
```

To show the UI of a specific leaderboard, simply pass the name of the leaderboard into the *ShowLeaderboardUI* method. You can also optionally specify the time scope:

```
// Show a specific leaderboard UI
GameServiceManager.ShowLeaderboardUI(YOUR_LEADERBOARD_NAME);

// Show a specific leaderboard UI in the Week time scope
GameServiceManager.ShowLeaderboardUI(YOUR_LEADERBOARD_NAME, TimeScope.Week);
```

Report Scores

To report scores to a leaderboard you need to specify the name of that leaderboard.

> It is strongly recommended that you use the constants of leaderboard names in the generated EM_GameServiceConstants class (see **Game Service Constants Generation** section) instead of typing the names directly in order to prevent runtime errors due to typos and the likes.

```
// Report a score of 100
// EM_GameServiceConstants.Sample_Leaderboard is the generated name constant
// of a leaderboard named "Sample Leaderboard"
GameServiceManager.ReportScore(100, EM_GameServiceConstants.Sample_Leaderboard);
```

Load Local User's Score

You can load the score of the local user (the authenticated user) on a leaderboard, to do so you need to specify the name of the leaderboard to load score from and a callback to be called when the score is loaded.

```
// Put this on top of the file to use IScore
UnityEngine.SocialPlatforms;

...

// Load the local user's score from the specified leaderboard
// EM_GameServiceConstants.Sample_Leaderboard is the generated name constant
// of a leaderboard named "Sample Leaderboard"
GameServiceManager.LoadLocalUserScore(EM_GameServiceConstants.Sample_Leaderboard, OnLo
calUserScoreLoaded);

...

// Score loaded callback
void OnLocalUserScoreLoaded(string leaderboardName, IScore score)
{
    if (score != null)
    {
        Debug.Log("Your score is: " + score.value);
    }
    else
    {
        Debug.Log("You don't have any score reported to leaderboard " + leaderboardNam
e);
    }
}
```

Load Scores

You can load a set of scores from a leaderboard with which you can specify the start position to load score, the number of scores to load, as well as the time scope and user scope.

```
// Put this on top of the file to use IScore
UnityEngine.SocialPlatforms;

...

// Load a set of 20 scores starting from rank 10 in Today time scope and Global user s
cope
// EM_GameServiceConstants.Sample_Leaderboard is the generated name constant
// of a leaderboard named "Sample Leaderboard"
GameServiceManager.LoadScores(
    EM_GameServiceConstants.Sample_Leaderboard,
    10,
    20,
    TimeScope.Today,
    UserScope.Global,
    OnScoresLoaded
);

...

// Scores loaded callback
void OnScoresLoaded(string leaderboardName, IScore[] scores)
{
    if (scores != null && scores.Length > 0)
    {
        Debug.Log("Loaded " + scores.Length + " from leadeboard " + leaderboardName);
        foreach (IScore score in scores)
        {
            Debug.Log("Score: " + score.value + "; rank: " + score.rank);
        }
    }
    else
    {
        Debug.Log("No score loaded.");
    }
}
```

You can also load the default set of scores, which contains 25 scores around the local user's score in the *AllTime* time scope and *Global* user scope.

```
// Put this on top of the file to use IScore
UnityEngine.SocialPlatforms;

...

// Load the default set of scores
// EM_GameServiceConstants.Sample_Leaderboard is the generated name constant
// of a leaderboard named "Sample Leaderboard"
GameServiceManager.LoadScores(EM_GameServiceConstants.Sample_Leaderboard, OnScoresLoad
ed);

...

// Scores loaded callback
void OnScoresLoaded(string leaderboardName, IScore[] scores)
{
    if (scores != null && scores.Length > 0)
    {
        Debug.Log("Loaded " + scores.Length + " from leadeboard " + leaderboardName);
        foreach (IScore score in scores)
        {
            Debug.Log("Score: " + score.value + "; rank: " + score.rank);
        }
    }
    else
    {
        Debug.Log("No score loaded.");
    }
}
```

Get All Leaderboards

You can obtain an array of all leaderboards created in the module settings interface:

```
// Get the array of all leaderboards created in the Game Service module settings
// Leaderboard is the class representing a leaderboard as declared in the module setti
ngs
// The GameService property of EM_Settings class holds the settings of this module
Leaderboard[] leaderboards = EM_Settings.GameService.Leaderboards;

// Print all leaderboard names
foreach (Leaderboard ldb in leaderboards)
{
    Debug.Log("Leaderboard name: " + ldb.Name);
}
```

Achievements

This section focuses on working with achievements.

Show Achievement UI

To show the achievements UI (the system view of achievements):

```
// Show achievements UI
GameServiceManager.ShowAchievementsUI();
```

You should check if the initialization has finished (the user has been authenticated) before showing the achievements UI, and take appropriate actions if the user is not logged in, e.g. show an alert or start another initialization process.

```
// Check for initialization before showing achievements UI
if (GameServiceManager.IsInitialized())
{
    GameServiceManager.ShowAchievementsUI();
}
else
{
    #if UNITY_ANDROID
    GameServiceManager.Init();    // start a new initialization process
    #elif UNITY_IOS
    Debug.Log("Cannot show achievements UI: The user is not logged in to Game Center."
);
    #endif
}
```

Reveal an Achievement

To reveal a hidden achievement, simply specify its name.

> As in the case of leaderboards, it is strongly recommended that you use the constants of achievement names in the generated EM_GameServiceConstants class instead of typing the names directly.

```
// Reveal a hidden achievement
// EM_GameServiceConstants.Sample_Achievement is the generated name constant
// of an achievement named "Sample Achievement"
GameServiceManager.RevealAchievement(EM_GameServiceConstants.Sample_Achievement);
```

Unlock an Achievement

To unlock an achievement:

```
// Unlock an achievement
// EM_GameServiceConstants.Sample_Achievement is the generated name constant
// of an achievement named "Sample Achievement"
GameServiceManager.UnlockAchievement(EM_GameServiceConstants.Sample_Achievement);
```

Report Incremental Achievement's Progress

To report the progress of an incremental achievement:

```
// Report a rogress of 50% for an incremental achievement
// EM_GameServiceConstants.Sample_Incremental_Achievement is the generated name consta
nt
// of an incremental achievement named "Sample Incremental Achievement"
GameServiceManager.UnlockAchievement(EM_GameServiceConstants.Sample_Incremental_Achiev
ement, 50.0f);
```

Get All Achievements

You can obtain an array of all achievements created in the module settings interface:

```
// Get the array of all achievements created in the Game Service module settings
// Achievement is the class representing an achievement as declared in the module sett
ings
// The GameService property of EM_Settings class holds the settings of this module
Achievement[] achievements = EM_Settings.GameService.Achievements;

// Print all achievement names
foreach (Achievement acm in achievements)
{
    Debug.Log("Achievement name: " + acm.Name);
}
```

Load User Profiles

You can load the profiles of friends of the local (authenticated) user. When the loading completes the provided callback will be invoked.

```
// Put this on top of the file to use IUserProfile
UnityEngine.SocialPlatforms;

...

// Load the local user's friend list
GameServiceManager.LoadFriends(OnFriendsLoaded);

...

// Friends loaded callback
void OnFriendsLoaded(IUserProfile[] friends)
{
    if (friends.Length > 0)
    {
        foreach (IUserProfile user in friends)
        {
            Debug.Log("Friend's name: " + user.userName + "; ID: " + user.id);
        }
     }
     else
     {
         Debug.Log("Couldn't find any friend.");
     }
}
```

You can also load user profiles by providing their IDs.

```
// Put this on top of the file to use IUserProfile
UnityEngine.SocialPlatforms;

...

// Load the profiles of the users with provided IDs
// idArray is the (string) array of the IDs of the users to load profiles
GameServiceManager.LoadUsers(idArray, OnUsersLoaded);

...

// Users loaded callback
void OnUsersLoaded(IUserProfile[] users)
{
    if (users.Length > 0)
    {
        foreach (IUserProfile user in users)
        {
            Debug.Log("User's name: " + user.userName + "; ID: " + user.id);
        }
     }
     else
     {
         Debug.Log("Couldn't find any user with the specified IDs.");
     }
}
```

Sign Out

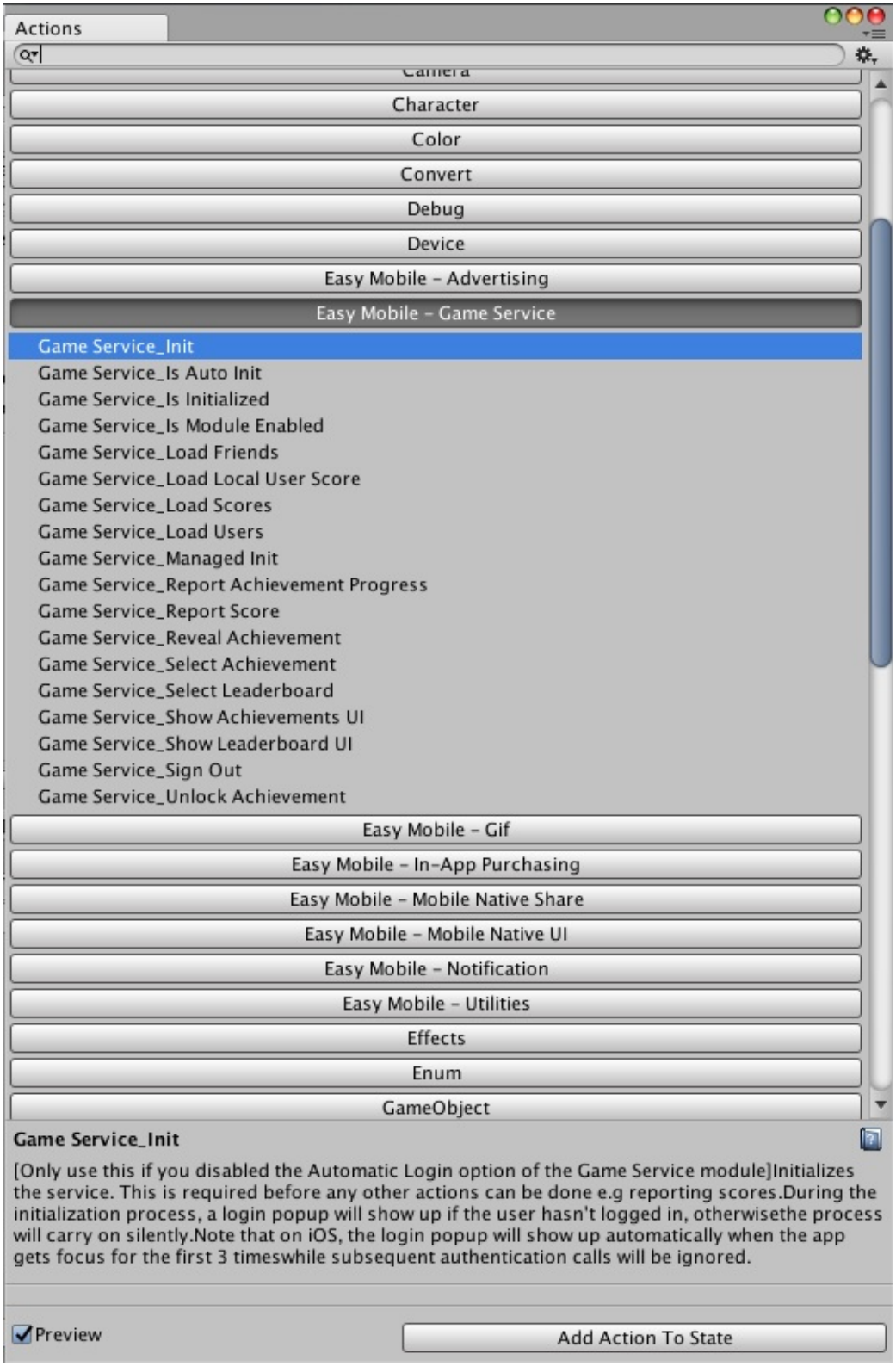
To sign the user out, simply call the *SignOut* method. Note that this method is only effective on Android.

```
// Sign the user out on Android
GameServiceManager.SignOut();
```

PlayMaker Actions

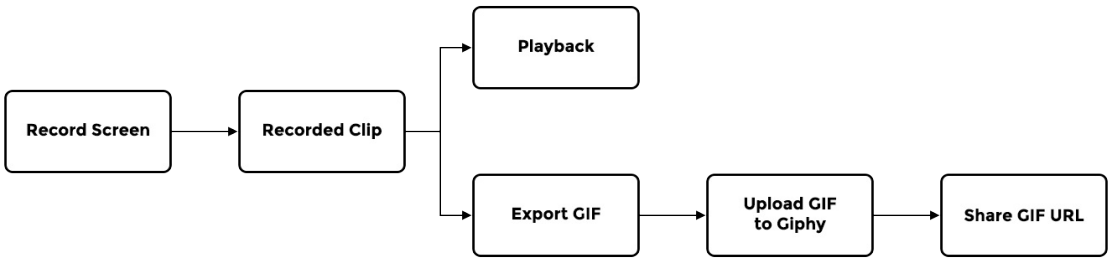
The PlayMaker actions of the Game Service module are group in the category *Easy Mobile - Game Service* in the PlayMaker's Action Browser.

> Please refer to the GameServiceDemo_PlayMaker scene in folder *Assets/EasyMobile/Demo/PlayMakerDemo/Modules* for an example on how these actions can be used.


Actions
Character
Color
Convert
Debug
Device
Easy Mobile - Advertising
Easy Mobile - Game Service
Game Service_Init
Game Service_Is Auto Init
Game Service_Is Initialized
Game Service_Is Module Enabled
Game Service_Load Friends
Game Service_Load Local User Score
Game Service_Load Scores
Game Service_Load Users
Game Service_Managed Init
Game Service_Report Achievement Progress
Game Service_Report Score
Game Service_Reveal Achievement
Game Service_Select Achievement
Game Service_Select Leaderboard
Game Service_Show Achievements UI
Game Service_Show Leaderboard UI
Game Service_Sign Out
Game Service_Unlock Achievement
Easy Mobile - Gif
Easy Mobile - In-App Purchasing
Easy Mobile - Mobile Native Share
Easy Mobile - Mobile Native UI
Easy Mobile - Notification
Easy Mobile - Utilities
Effects
Enum
GameObject
Game Service_Init
[Only use this if you disabled the Automatic Login option of the Game Service module]Initializes the service. This is required before any other actions can be done e.g reporting scores.During the initialization process, a login popup will show up if the user hasn't logged in, otherwisethe process will carry on silently.Note that on iOS, the login popup will show up automatically when the app gets focus for the first 3 timeswhile subsequent authentication calls will be ignored.
Preview
Add Action To State

GIF

The GIF module provides you convenient tools to record screen activities into a short clip, play the recorded clip and export it into a GIF image. You can then upload the GIF file to hosting sites like Giphy and finally share its URL to social networks. In short, this module helps you easily add the GIF sharing feature to your game, which allows the user to share animated GIF images of the gameplay, instead of still screenshots, to social networks including Facebook and Twitter. The following picture illustrates a typical workflow of such feature.



Here're some highlights of this module:

- **High performance, mobile-friendly GIF generator**
  - Low overhead screen/camera recorder
  - GIF generation is done in native code (iOS and Android) on a separate thread to allow fast exporting while minimizing impact to the main thread. Export callbacks are still called from main thread though, so you can safely access Unity API in the callback handlers
- **Flexible, fully controllable process**
  - You have full control on the sizes, length, frame rate, loop mode and quality of the exported GIF
  - You can also set the priority of the exporting thread to best suit your needs
- **High quality GIF**
  - Exported GIF employs GIF89a format and uses 256-color local palettes (one palette per frame)
  - Frame image data is LWZ compressed
- **Works in Unity editor**
  - GIF exporting also works in the editor, mostly for testing purpose. On mobiles, the

exporting is done in native code, while in editor it is done in managed code using an adapted version of the Moments plugin (see the **Acknowledgement** section)

- **Easy GIF sharing**
    - This module also provides Giphy API for uploading GIF images to Giphy, so that they can be shared and played on major social networks including Facebook and Twitter using the Giphy hosted URLs

Acknowledgement

The recorder used in this module is adapted from the recorder of the Moments plugin by Chman (Thomas Hourdel). Also, in Unity editor, GIF generation is done using an adapted version of this plugin.

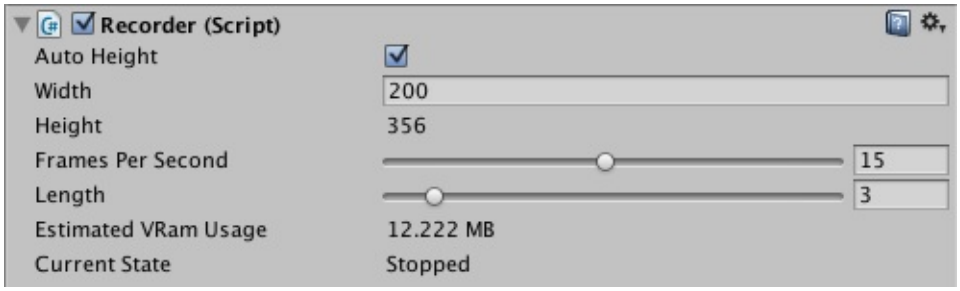
Setup

This section explains the various components, objects and concepts involved in clip recording, clip playing and GIF exporting. It also provides a guide on creating and configuring relevant objects and components.

The Recorder component

The Recorder component records the content rendered by a camera and returns the recorded clip. To start recording, simply add a Recorder component to the camera that renders the content you're interested in recording (normally this will be the Main Camera). To add the component to a camera, select that camera in the Hierarchy, then click *Add Component* > *Easy Mobile* > *Recorder*.

Once the Recorder component is added to the camera, you can start configuring it in the inspector to determine how the recorded clip (and as a result, the exported GIF) will be like.



- *Auto Height*: whether the clip height should be computed automatically from the

specified width and the camera's aspect ratio, which is useful to make sure the exported GIF has a correct aspect ratio
- *Width*: the width of the recorded clip in pixels
- *Height*: the height of the recorded clip in pixels
- *Frames Per Second*: the frame rate of the clip
- *Length*: the clip length in seconds; the recorder automatically discards old content to preserve this length, e.g. if you set this value to 3 seconds, only last 3 seconds of the recording will be stored in the resulted clip, the rest will be discarded
- *Estimated VRam Usage*: the estimated memory used for recording, calculated based on the above settings
- *Current State*: the current status of the recorder, which is either *Stopped* or *Recording*

Now that the recorder is configured, you can start and stop its recording activity from script (see the **Scripting** section). Once the recording is stopped, the recorded clip will be returned for playback of GIF exporting.

> **Recording the UI**
>
> To record the UI (Canvas content), you need to set the Canvas Render Mode to World Space or Screen Space - Camera, and set the Render Camera to the one containing the Recorder component in the latter case.
>
> **Recording multiple composited cameras**
>
> If your scene contains multiple cameras being composited (using Camera.depth and Clear flags), you can add the Recorder component to the top-most camera, so it captures whatever content being composited and shown by that camera.

The AnimatedClip class

Recorded clips are represented by the *AnimatedClip* class, which has following properties:

- *Width*: the width of the clip in pixels
- *Height*: the height of the clip in pixels
- *Frame Per Second*: the frame rate of the clip
- *Length*: the length of the clip in seconds
- *Frames*: an array of frames, each frame is a *Render Texture* object

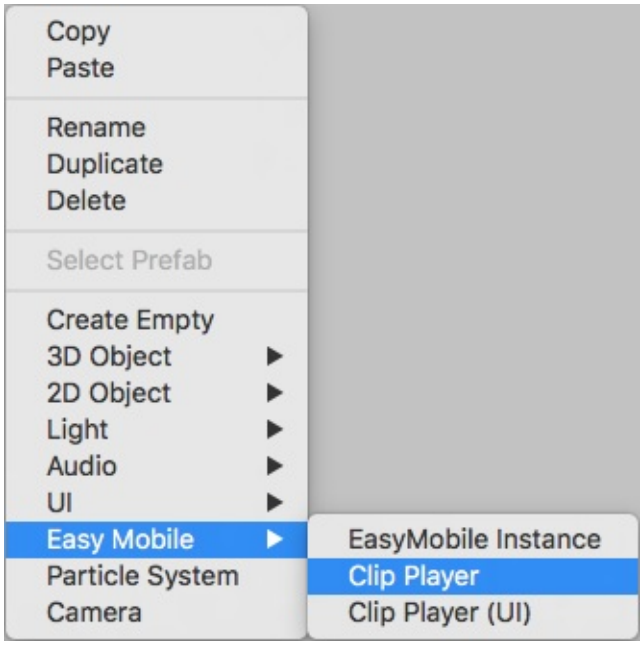
Playback

Easy Mobile provides two built-in objects dedicated for playing recorded clips: the Clip Player and Clip Player UI objects. You can create them from the context menu (as you would with other Unity built-in objects), configure them in the inspector, and start or stop their

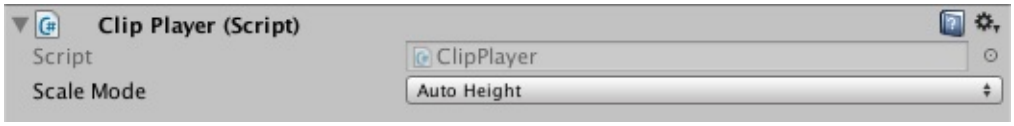
playing activity from script (see the **Scripting** section).

Clip Player

The Clip Player is a non-UI object, which is basically a Quad object equipped with a ClipPlayer component. It is meant to be used inside the game world. To create a Clip Player object, right-click in the Hierarchy window to open the context menu, then select *Easy Mobile* > *Clip Player*.



Each Clip Player object contains a ClipPlayer component.

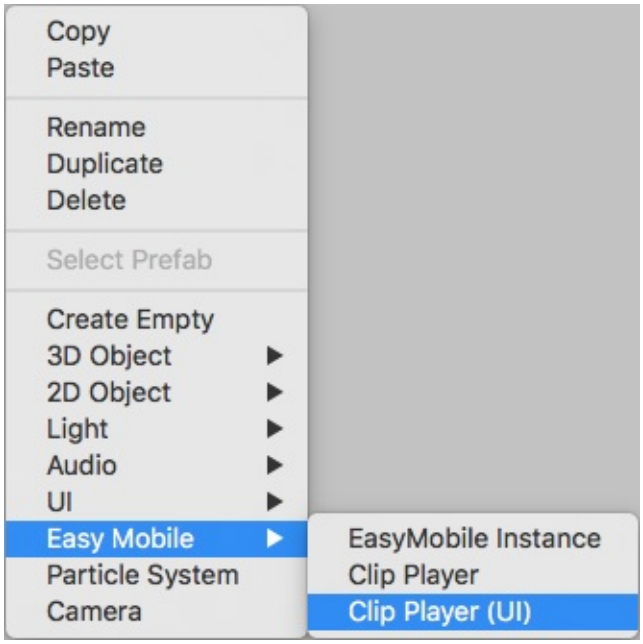


The only parameter of this component is the *Scale Mode*, which can take one of 3 values:

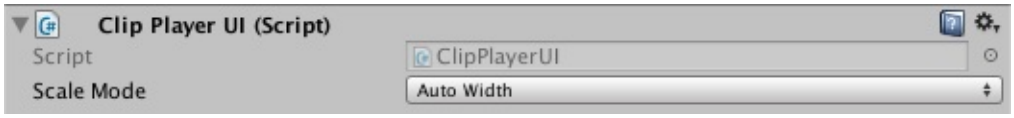
- *None*: don't adjust the object sizes
- *Auto Height*: keeps the current height of the object (the Y component of its localScale), and adjust the width (the X component of its localScale) to match the aspect ratio of the clip being played
- *Auto Width*: keeps the current width of the object (the X component of its localScale), and adjust the height (the Y component of its localScale) to match the aspect ratio of the clip being played

Clip Player UI

The Clip Player UI, as it name implies, is a UI object living inside a Canvas. It is the object to use when you want to play a clip inside the UI. It is basically a Raw Image object equipped with a ClipPlayerUI component. To create a Clip Player UI object, right-click in the Hierarchy window to open the context menu, then select *Easy Mobile* > *Clip Player (UI)*.



Each Clip Player UI object contains a ClipPlayerUI component.



The only parameter of this component is the *Scale Mode*, which can take one of 3 values:

- *None*: don't adjust the object sizes
- *Auto Height*: keeps the current height of the object (the Height value in its Rect Transform), and adjust the width (the Width value in its Rect Transform) to match the aspect ratio of the clip being played
- *Auto Width*: keeps the current width of the object (the Width value in its Rect Transform), and adjust the height (the Height value in its Rect Transform) to match the aspect ratio of the clip being played

Custom Clip Player

Beside the two built-in clip players provided by Easy Mobile, you can construct your own player to serve your specific needs. To make it consistent with other players, and compatible with Easy Mobile API, this player should contain a script implementing the *IClipPlayer* interface, which is responsible for applying the frames (*RenderTextures*) of the clip, at the required frame rate, to whatever texture-displaying component it is equipped with.

Scripting

This section provides a guide to work with the GIF API. At this stage, it's assumed that you have setup a recorder for the camera you want to record, and created an appropriate clip player to play the recorded clip. If you're not familiar with these concepts, please review the **Setup** section.

> You can access all the GIF API methods via the Gif class under the EasyMobile namespace. As for Giphy API, use the Giphy class.

Recording

To start recording on the created recorder, use the *StartRecording* method. You can do this as soon as the game starts; the recorder only stores a few last seconds (specified by the *Length* parameter in the Recorder inspector) of the recording, and automatically discards the rest.

```
// Use the EasyMobile namespace
using EasyMobile;

...

// Drag the camera with the Recorder component to this field in the inspector
public Recorder recorder;

...

// You can start recording as soon as your game starts
// (suppose you have a method named StartGame, which is called when the game starts)
void StartGame()
{
    // Start recording!
    Gif.StartRecording(recorder);

    // Do other stuff...
}
```

To stop recording, simply call the *StopRecording* method, passing the relevant recorder. The method returns an *AnimatedClip* object, which can be played or exported into a GIF image afterward. To continue the previous example:

```
// Use the EasyMobile namespace
using EasyMobile;

...

// Drag the camera with the Recorder component to this field in the inspector
public Recorder recorder;

// The recorded clip
AnimatedClip myClip;

// You can start recording as soon as your game starts
// (suppose you have a method named StartGame, which is called when the game starts)
void StartGame()
{
    // Start recording!
    Gif.StartRecording(recorder);

    // Do other stuff...
}

...

// A suitable time to stop recording may be when the game ends (the player dies)
// (suppose you have a method named GameOver, called when the game ends)
void GameOver()
{
    // Stop recording
    myClip = Gif.StopRecording(recorder);

    // Do other stuff...
}
```

Playback

To play a recorded clip using a pre-created clip player, use the *PlayClip* method. This method receives as argument an *IClipPlayer* interface, which is implemented by both *ClipPlayer* and *ClipPlayerUI* classes, therefore it works with both Clip Player and Clip Player UI object. The second argument is an *AnimatedClip* object. Other arguments include an optional delay time before the playing starts, and the looping mode. You can pause, resume and stop the player using the *PausePlayer*, *ResumePlayer* and *StopPlayer* methods, respectively.

To continue the previous example:

```
// Use the EasyMobile namespace
using EasyMobile;
```

```
...

// Drag the camera with the Recorder component to this field in the inspector
public Recorder recorder;

// Suppose you've created a ClipPlayerUI object (ClipPlayer will also work)
// Drag the pre-created clip player to this field in the inspector
public ClipPlayerUI clipPlayer;

// The recorded clip
AnimatedClip myClip;

// You can start recording as soon as your game starts
// (suppose you have a method named StartGame, which is called when the game starts)
void StartGame()
{
    // Start recording!
    Gif.StartRecording(recorder);

    // Do other stuff...
}

...

// A suitable time to stop recording may be when the game ends (the player dies)
// (suppose you have a method named GameOver, called when the game ends)
void GameOver()
{
    // Stop recording
    myClip = Gif.StopRecording(recorder);

    // Play the recorded clip!
    PlayMyClip();
}

...

// This method plays the recorded clip on the created player,
// with no delay before playing, and loop indefinitely.
void PlayMyClip()
{
    Gif.PlayClip(clipPlayer, myClip);
}

// This method plays the recorded clip on the created player,
// with a delay of 1 seconds before playing, and loop indefinitely,
// (you can set loop = false to play the clip only once)
void PlayMyClipWithDelay()
{
    Gif.PlayClip(clipPlayer, myClip, 1f, true);
}

// This method pauses the player.
```

```
void PausePlayer()
{
    Gif.PausePlayer(clipPlayer);
}

// This method un-pauses the player.
void UnPausePlayer()
{
    Gif.ResumePlayer(clipPlayer);
}

// This method stops the player.
void StopPlayer()
{
    Gif.StopPlayer(clipPlayer);
}
```

GIF Export

To export the recorded clip into a GIF image, use the *ExportGif* method. In the editor, the exported GIF file will be stored right under the *Assets* folder; on mobile devices, the storage location is Application.persistentDataPath. You can specify the filename and the quality of the GIF image as well as the priority of the exporting thread. The quality setting accepts values from 1 to 100 (inputs will be clamped to this range). Bigger values will result in better looking GIFs, but will take slightly longer processing time; 80 is generally a good value in terms of time-quality balance. This method has two callbacks: one is called repeatedly during the process and receives the progress value (0 to 1), the other is called when the export completes and receives the file path of the generated image. Though the GIF generation process is done in a separate thread, these callbacks are guaranteed to be called from the main thread, so you can safely access all Unity API from within them.

In the rare case that you want to control the looping mode of the exported GIF (the default is loop indefinitely), use the variant of *ExportGif* that has a *loop* parameter (note that some GIF players may ignore this setting):

- *loop* < *0*: disable looping (play once)
- *loop* = *0*: loop indefinitely
- *loop* > *0*: loop a number of times

In the following example, we'll export a GIF image from the recorded clip returned after the recording has stopped.

```
// Use the EasyMobile namespace
using EasyMobile;

...
```

```
// Drag the camera with the Recorder component to this field in the inspector
public Recorder recorder;

// The recorded clip
AnimatedClip myClip;

// You can start recording as soon as your game starts
// (suppose you have a method named StartGame, which is called when the game starts)
void StartGame()
{
    // Start recording!
    Gif.StartRecording(recorder);

    // Do other stuff...
}

...

// A suitable time to stop recording can be when the game ends (the player dies)
// (suppose you have a method named GameOver, called when the game ends)
void GameOver()
{
    // Stop recording
    myClip = Gif.StopRecording(recorder);

    // Export GIF image from the resulted clip
    ExportMyGif();
}

...

// This method exports a GIF image from the recorded clip.
void ExportMyGif()
{
    // Parameter setup
    string filename = "myGif";    // filename, no need the ".gif" extension
    int loop = 0;                 // -1: no loop, 0: loop indefinitely, >0: loop a set
 number of times
    int quality = 80;             // 80 is a good value in terms of time-quality balan
ce
    System.Threading.ThreadPriority tPriority = System.Threading.ThreadPriority.Normal
; // exporting thread priority

    Gif.ExportGif(myClip,
                  filename,
                  loop,
                  quality,
                  tPriority,
                  OnGifExportProgress,
                  OnGifExportCompleted);
}
```

```
// This callback is called repeatedly during the GIF exporting process.
// It receives a reference to original clip and a progress value ranging from 0 to 1.
void OnGifExportProgress(AnimatedClip clip, float progress)
{
    Debug.Log(string.Format("Export progress: {0:P0}", progress));
}

// This callback is called once the GIF exporting has completed.
// It receives a reference to the original clip and the filepath of the generated imag
e.
void OnGifExportCompleted(AnimatedClip clip, string path)
{
    Debug.Log("A GIF image has been created at " + path);
}
```

Disposing of AnimatedClip

Internally, each *AnimatedClip* object consists of an array of *RenderTexture*, a "native engine object" type, which is not garbage collected as normal managed types. That means these render textures won't be "destroyed" automatically when their containing clip is garbage collected (the clip object does get collected, but the render textures it references don't, thus creating memory leaks). To take care of this issue, we have the *AnimatedClip* implement the *IDisposable* interface and provide the *Dispose* method to release the render textures, as Unity recommended. You *must* call this *Dispose* method, preferably as soon as you're done with using a clip (after playing or exporting GIF), to make sure the render textures are properly released and not cause memory issues.

We'll extend the *OnGifExportCompleted* callback handler of the previous example to dispose the recorded clip as soon as we've generated a GIF image from it.

```
// This callback is called once the GIF exporting has completed.
// It receives a reference to the original clip and the filepath of the generated imag
e.
void OnGifExportCompleted(AnimatedClip clip, string path)
{
    Debug.Log("A GIF image has been created at " + path);

    // We've done using the clip, dispose it to save memory
    if (clip == myClip)
    {
        myClip.Dispose();
        myClip = null;
    }
}
```

GIF Sharing

Now that a GIF image has been created, you may want to share it (because it's not fun otherwise, is it?). A common approach is to first upload the image to Giphy, a popular GIF hosting site, and then share the returned URL to other social networks like Facebook and Twitter, using Easy Mobile's Native Sharing feature (see the *Native Sharing > Scripting* section, in particular the *ShareURL* method).

> According to Giphy API documentation, hosted Giphy URLs are supported and play on every major social network.

Upload to Giphy

To upload a GIF image to Giphy, use the *Upload* method of the *Giphy* class. You can upload a local image on your device, or an image hosted online, provided that you have its URL. Before doing so, you'll need to prepare the upload content by creating a *GiphyUploadParams* struct. In this struct you'll specify either the file path of the local image, or the URL of the online image to upload. Note that if both parameters are provided, the local file path will be used over the URL. Within this struct you can also specify other optional parameters such as image tags, the source of the image (e.g. your website), or mark the image as private (only visible by you on Giphy). The *Upload* method has three callbacks: the first one is called repeatedly during the upload process, receiving a progress value (0 to 1); the second one is called once the upload has completed, receiving the URL of the uploaded image; and the last one will be called if the upload has failed, receiving the error message. All callbacks are called from the main thread.

> **Giphy Beta and Production Key**
>
> The *Upload* method has two variants: one using Giphy's public beta key, and the other using your own channel username and production API key. The public beta key is meant to be used in development only. According to Giphy Upload API documentation, it is "subject to rate limit constraints", and they "do not encourage live production deployments to use the public key". If you have created a Giphy channel and want to upload GIF images directly to that channel, you'll need to request an Upload Production Key, then provide that key and your channel username to the *Upload* method.

We'll extend the above example, and modify the *OnGifExportCompleted* callback handler to upload the GIF image to Giphy once it is created. We'll demonstrate two cases: upload using the public beta key and upload using your own production key.

```
...

// This callback is called once the GIF exporting has completed.
// It receives a reference to the original clip and the filepath of the generated imag
e.
void OnGifExportCompleted(AnimatedClip clip, string path)
```

```
{
    Debug.Log("A GIF image has been created at " + path);

    // We've done using the clip, dispose it to save memory
    if (clip == myClip)
    {
        myClip.Dispose();
        myClip = null;
    }

    // The GIF image has been created, now we'll upload it to Giphy
    // First prepare the upload content
    var content = new GiphyUploadParams();
    content.localImagePath = path;    // the file path of the generated GIF image
    content.tags = "easy mobile, sglib games, unity";    // optional image tags, comma
-delimited
    content.sourcePostUrl = "YOUR_WEBSITE_ADDRESS";    // optional image source, e.g.
your website
    content.isHidden = false;    // optional hidden flag, set to true to mark the imag
e as private

    // Upload the image to Giphy using the public beta key
    UploadToGiphyWithBetaKey(content);
}

// This method uploads a GIF image to Giphy using the public beta key,
// no need to specify any username or API key here.
void UploadToGiphyWithBetaKey(GiphyUploadParams content)
{
    Giphy.Upload(content, OnGiphyUploadProgress, OnGiphyUploadCompleted, OnGiphyUpload
Failed);
}

// This method uploads a GIF image to your own Giphy channel,
// using your channel username and production key.
void UploadToGiphyWithProductionKey(GiphyUploadParams content)
{
    Giphy.Upload("YOUR_CHANNEL_USERNAME", "YOUR_PRODUCTION_KEY",
                    content,
                    OnGiphyUploadProgress,
                    OnGiphyUploadCompleted,
                    OnGiphyUploadFailed);
}

// This callback is called repeatedly during the uploading process.
// It receives a progress value ranging from 0 to 1.
void OnGiphyUploadProgress(float progress)
{
    Debug.Log(string.Format("Upload progress: {0:P0}", progress));
}

// This callback is called once the uploading has completed.
// It receives the URL of the uploaded image.
```

```
void OnGiphyUploadCompleted(string url)
{
    Debug.Log("The GIF image has been uploaded successfully to Giphy at " + url);
}

// This callback is called if the upload has failed.
// It receives the error message.
void OnGiphyUploadFailed(string error)
{
    Debug.Log("Uploading to Giphy has failed with error: " + error);
}
```

Display the Giphy Attribution Marks

To request a Production Key, Giphy require you to display the "Powered by Giphy" attribution marks whenever their API is utilized in your app, and provide screenshots of your attribution placement when submitting for the key. To take care of this, we provide the static *IsUsingAPI* boolean property inside the *Giphy* class. This property will be true as long as Giphy API is in use, to let you know when to show their attribution marks. You can display the attribution logo using an Image or a Sprite object, then poll this property inside the Update() function, and activate or deactivate the object accordingly.

> You can download Giphy's official attribution marks here.

```
// Drag the object displaying the attribution marks to this field in the inspector
public GameObject attribution;

...

void Update()
{
    attribution.SetActive(Giphy.IsUsingAPI);
}
```

Share Giphy URLs

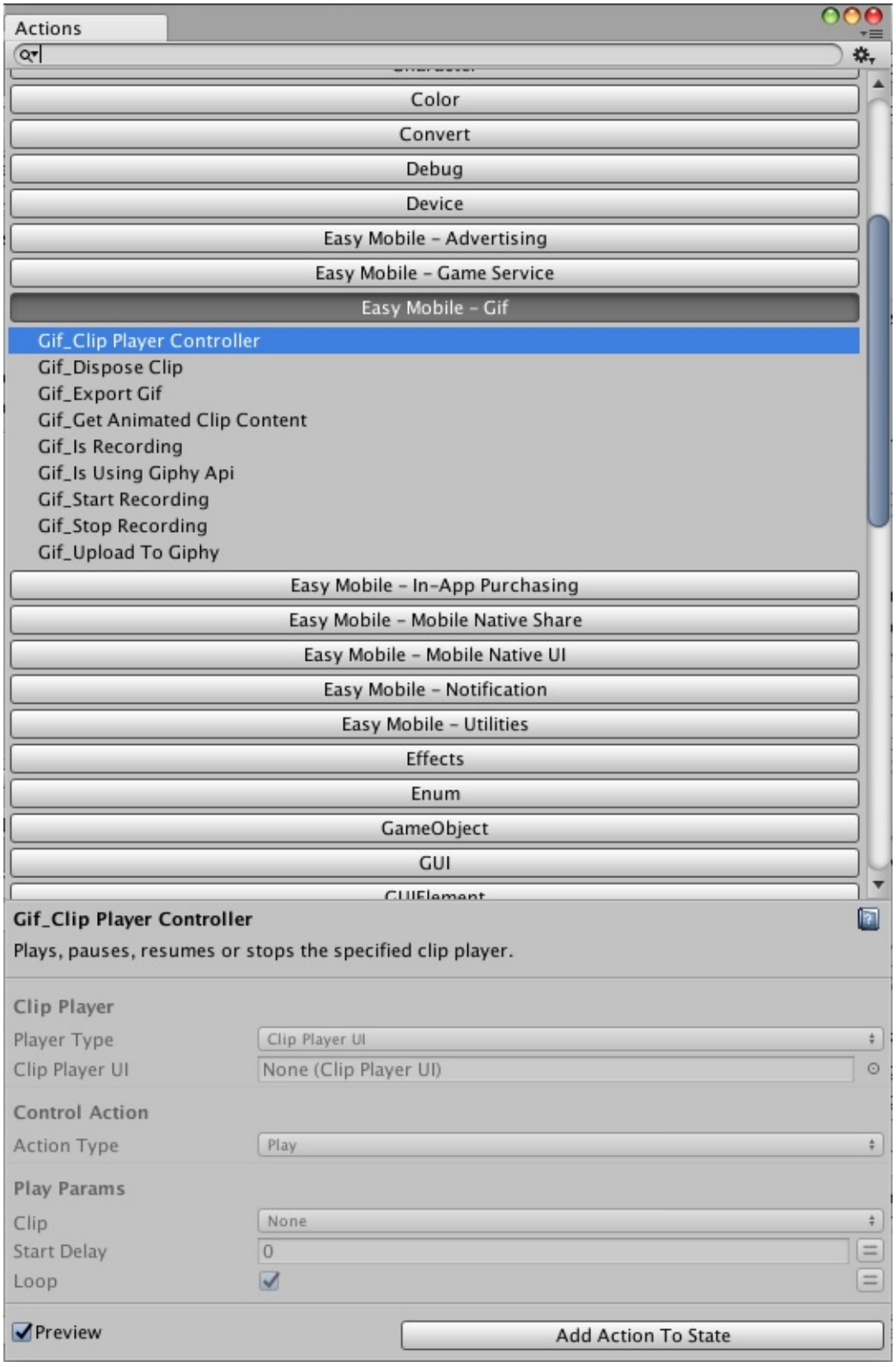
After uploading your GIF image to Giphy and obtain its URL, you can share this URL using the *ShareURL* method of the *MobileNativeShare* class. In the example below, we'll modify the *OnGiphyUploadCompleted* callback handler of the previous example to store the returned URL into a global variable, which can be used for later sharing.

```
...

// Global variable to hold the Giphy URL of the uploaded GIF
string giphyURL;

...

// This callback is called once the uploading has completed.
// It receives the URL of the uploaded image.
void OnGiphyUploadCompleted(string url)
{
    Debug.Log("The GIF image has been uploaded successfully to Giphy at " + url);

    // Store the URL into our global variable
    giphyURL = url;
}

...

// This method shares the URL using the native sharing utility on iOS and Android
public void ShareGiphyURL()
{
    if (!string.IsNullOrEmpty(giphyURL))
    {
        MobileNativeShare.ShareURL(giphyURL);
    }
}
```

PlayMaker Actions

The PlayMaker actions of the GIF module are group in the category *Easy Mobile - Gif* in the PlayMaker's Action Browser.

> Please refer to the GifDemo_PlayMaker scene in folder *Assets/EasyMobile/Demo/PlayMakerDemo/Modules* for an example on how these actions can be used.


Actions
Color
Convert
Debug
Device
Easy Mobile - Advertising
Easy Mobile - Game Service
Easy Mobile - Gif
Gif_Clip Player Controller
Gif_Dispose Clip
Gif_Export Gif
Gif_Get Animated Clip Content
Gif_Is Recording
Gif_Is Using Giphy Api
Gif_Start Recording
Gif_Stop Recording
Gif_Upload To Giphy
Easy Mobile - In-App Purchasing
Easy Mobile - Mobile Native Share
Easy Mobile - Mobile Native UI
Easy Mobile - Notification
Easy Mobile - Utilities
Effects
Enum
GameObject
GUI
Gif_Clip Player Controller
Plays, pauses, resumes or stops the specified clip player.
Clip Player
Player Type
Clip Player UI
Clip Player UI
None (Clip Player UI)
Control Action
Action Type
Play
Play Params
Clip
None
Start Delay
0
Loop
Preview
Add Action To State

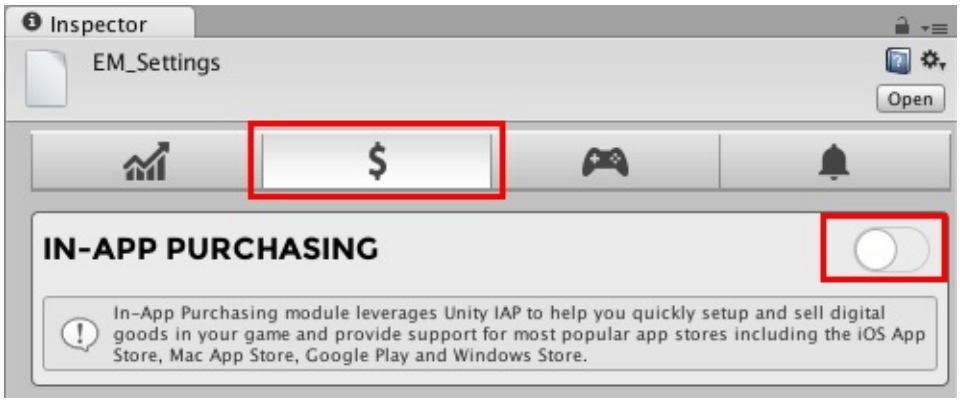
In-App Purchasing

The In-App Purchasing module helps you quickly setup and sell digital products in your game. Here're some highlights of this modules:

- **Leverages Unity In-App Purchasing service**
    - This module is built on top of Unity IAP service, a powerful service that supports most app stores including iOS App Store, Google Play, Amazon Apps, Samsung GALAXY Apps and Tizen Store
    - Unity IAP is tightly integrated with the Unity engine, so compatibility and reliability can be expected
- **Easy management of product catalog**
    - Easy Mobile's custom editor features a friendly interface that helps you easily add, edit or remove products
- **Receipt validation**
    - Local receipt validation that offers extra security

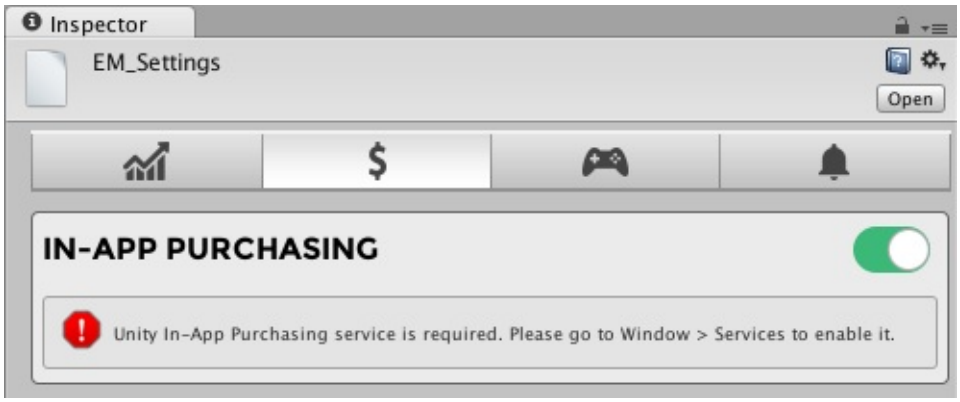
Module Configuration

To use the In-App Purchasing module you must first enable it. Go to *Window* > *Easy Mobile* > *Settings*, select the In-App Purchasing tab, then click the right-hand side toggle to enable and start configuring the module.



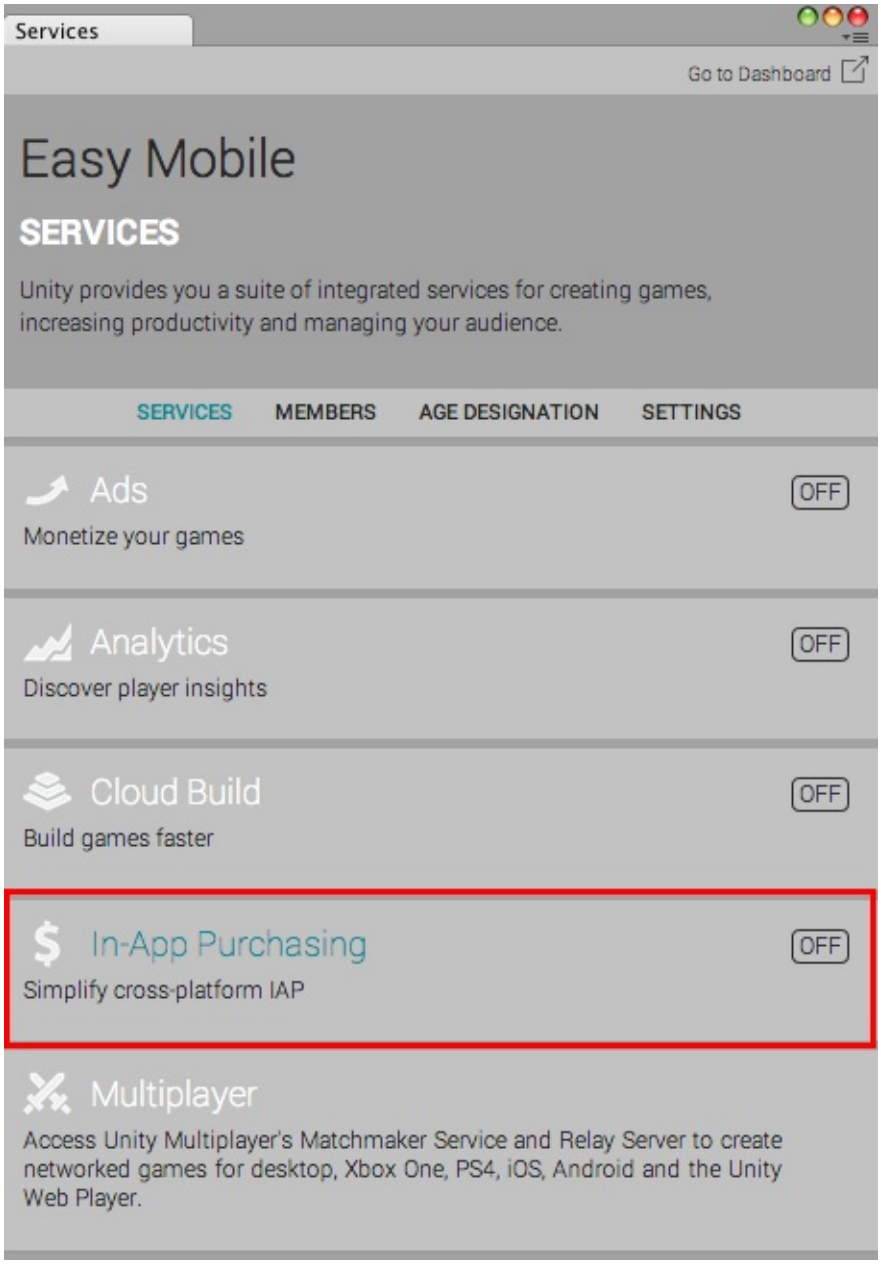
Enable Unity IAP

The In-App Purchasing module requires Unity IAP service to be enabled. It will automatically check for the service's availability and prompt you to enable it if needed. Below is the module settings interface when Unity IAP is disabled.

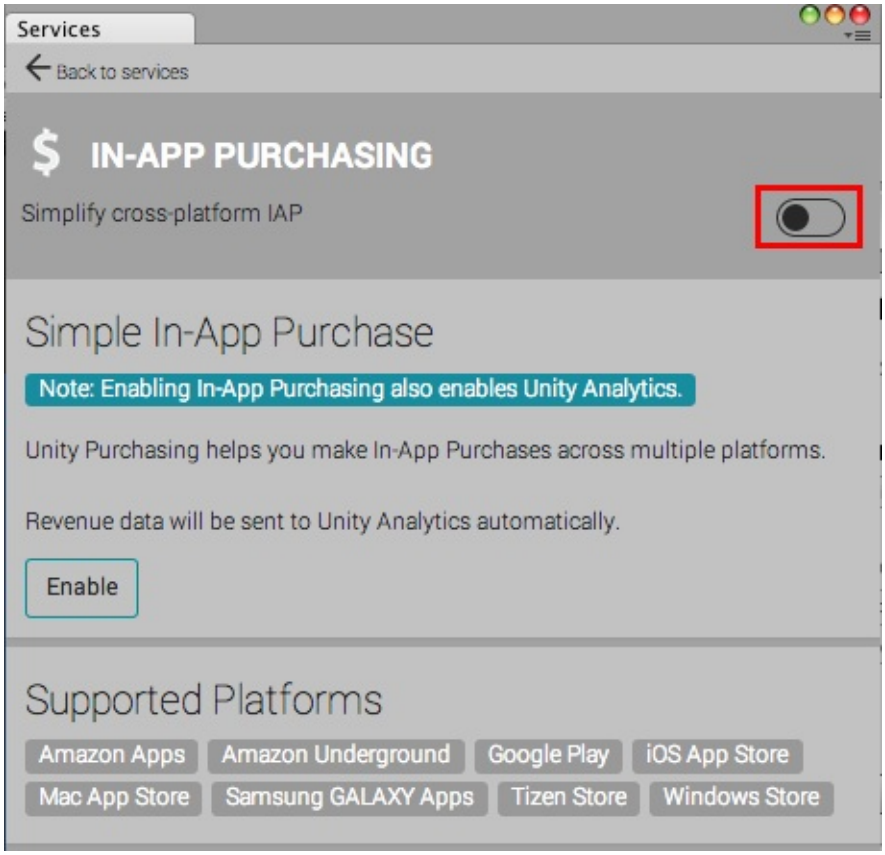


> To use Unity In-App Purchasing service, you must first set up your project for Unity Services.

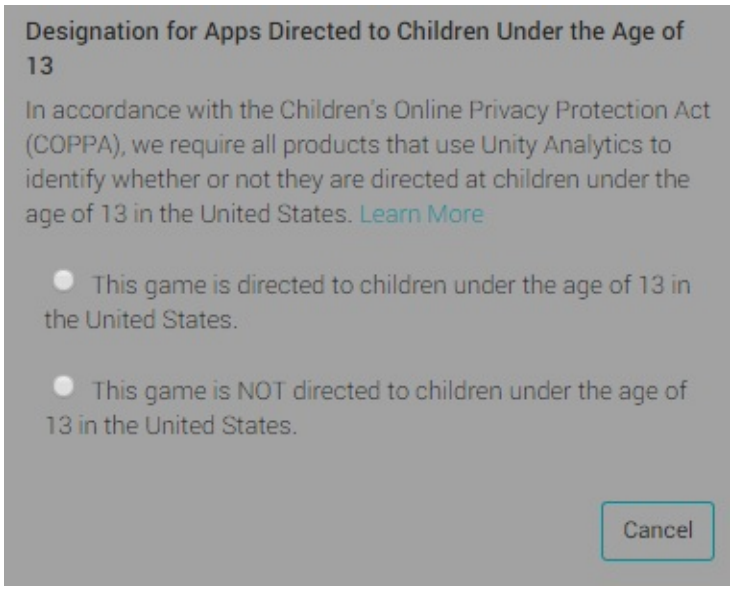
To enable Unity IAP service go to *Window* > *Services* and select the In-App Purchasing tab.



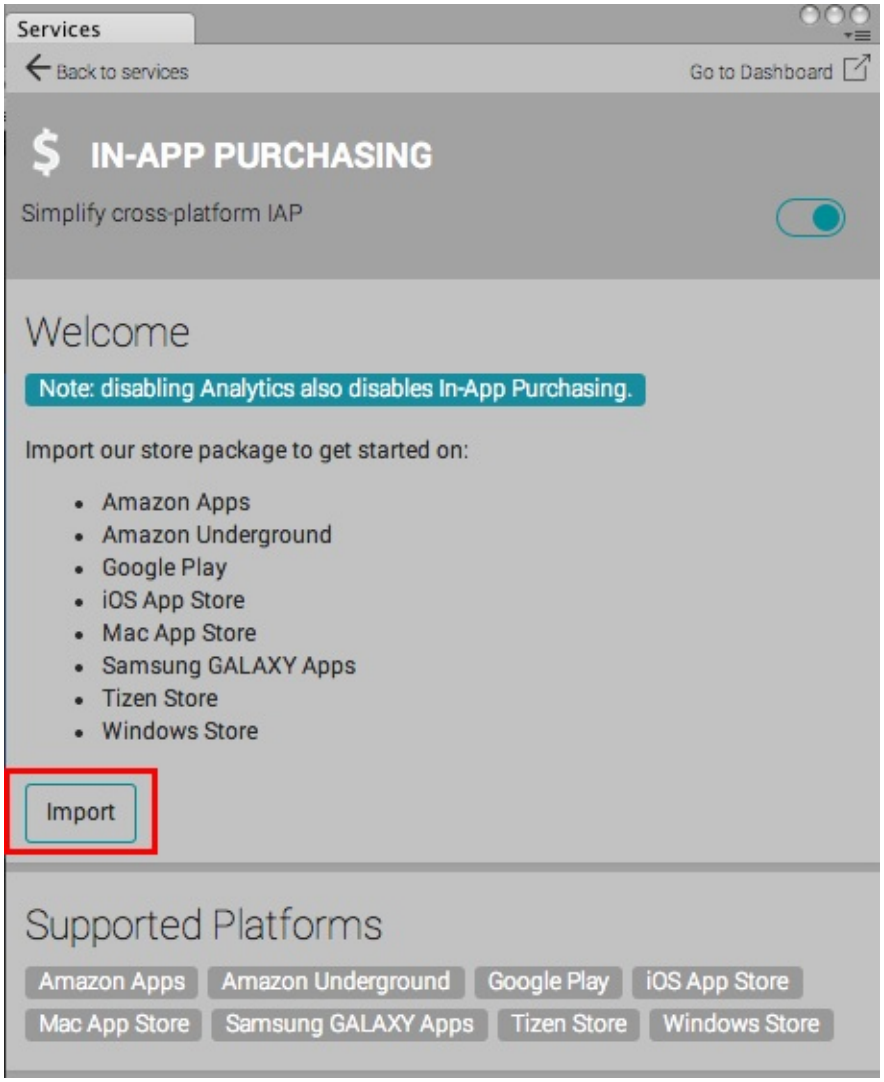
In the opened configuration window, click the toggle at the right-hand side or the *Enable* button to enable Unity IAP service.



A dialog window will appear asking a few questions about your game in order to ensure COPPA compliance.

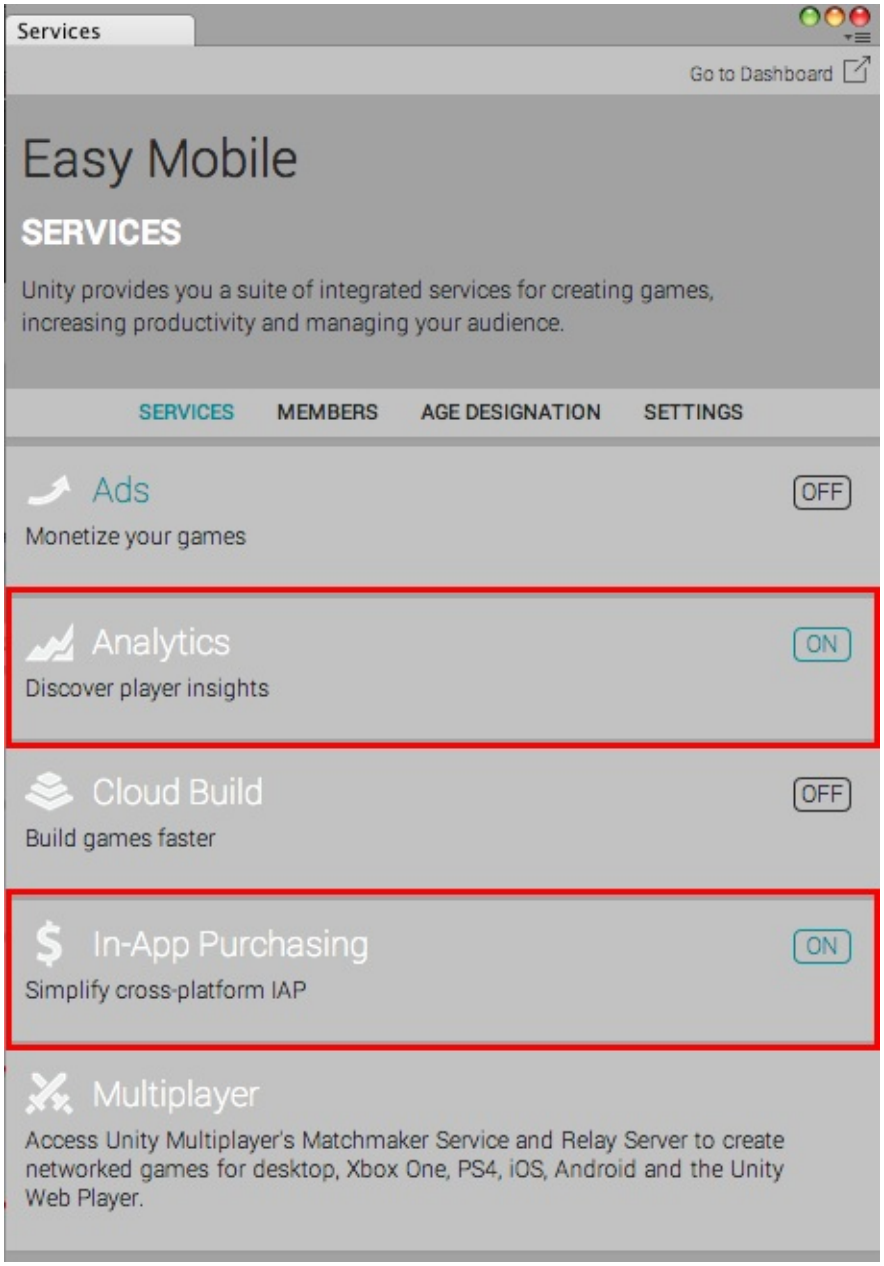


Next click the *Import* button to import the Unity IAP package to your project.

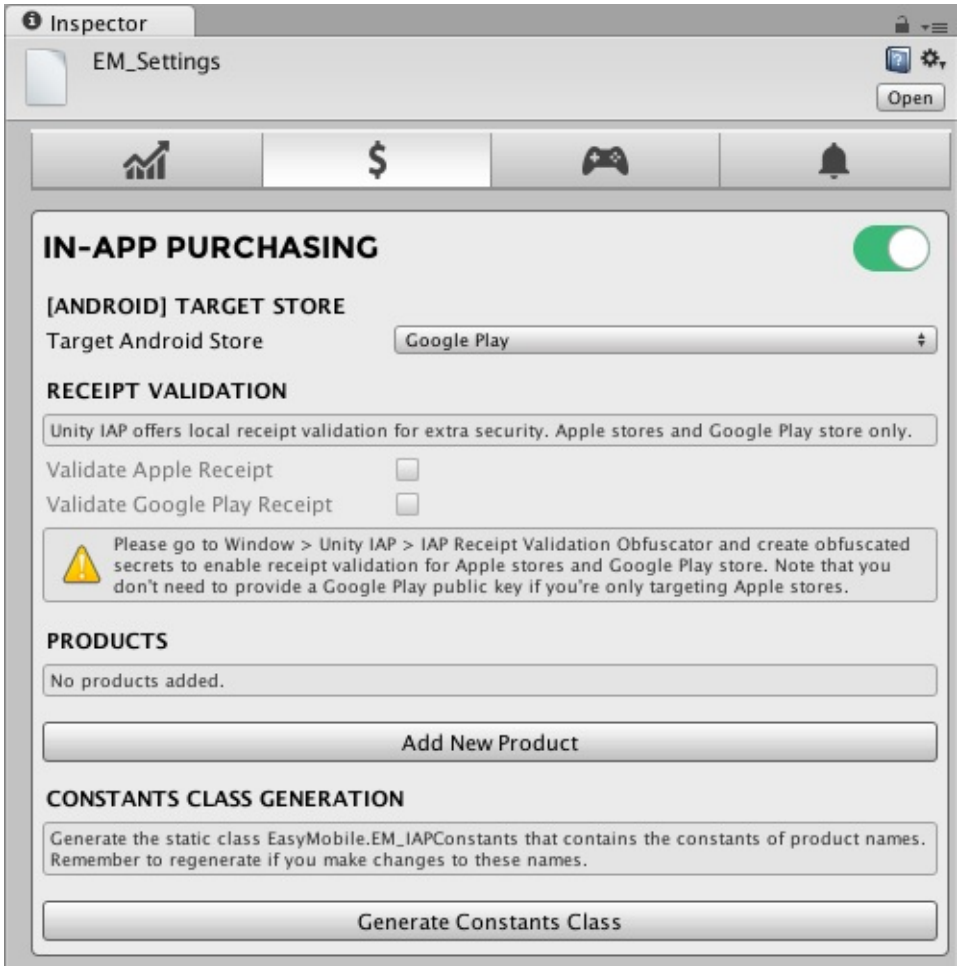


> After importing, there should be a UnityPurchasing folder added under Assets/Plugins folder.

Enabling Unity IAP service will automatically enable the Unity Analytics service (if it's not enabled before), this is a requirement to use Unity IAP. Go back to the Services panel and make sure that both In-App Purchasing and Analytics services are now enabled.

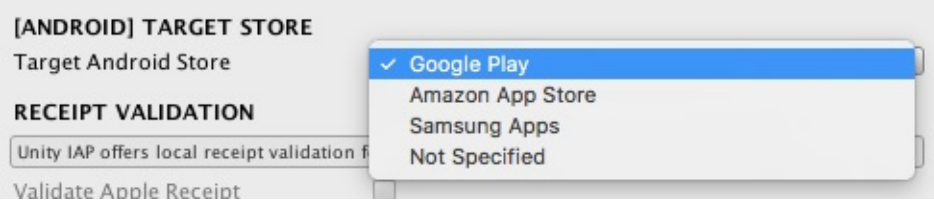


After enabling Unity IAP service, the settings interface of the In-App Purchasing module will be updated and ready for you to start configuring.


Inspector
EM_Settings
Open
IN-APP PURCHASING
[ANDROID] TARGET STORE
Target Android Store
Google Play
RECEIPT VALIDATION
Unity IAP offers local receipt validation for extra security. Apple stores and Google Play store only.
Validate Apple Receipt
Validate Google Play Receipt
Please go to Window > Unity IAP > IAP Receipt Validation Obfuscator and create obfuscated secrets to enable receipt validation for Apple stores and Google Play store. Note that you don't need to provide a Google Play public key if you're only targeting Apple stores.
PRODUCTS
No products added.
Add New Product
CONSTANTS CLASS GENERATION
Generate the static class EasyMobile.EM_IAPConstants that contains the constants of product names. Remember to regenerate if you make changes to these names.
Generate Constants Class

Target Android Store

If you're building for Android platform, you need to specify your target store. In the **[ANDROID] TARGET STORE** section select your target store from the dropdown.



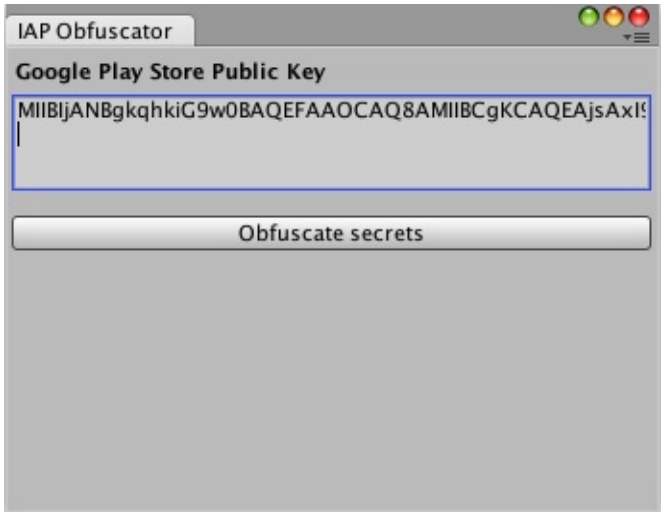
Receipt Validation

The receipt validation feature provides extra security and helps prevent prevent fraudulent users from accessing content they have not purchased. This feature employs Unity IAP's local receipt validation, which means the validation takes place on the target device, without the need to connect to a remote server.

> Receipt validation is available for Apple stores and Google Play store. Please find more information about Unity IAP's receipt validation here.

Obfuscating Encryption Keys

To enable receipt validation, you must first create obfuscated encryption keys. The purpose of this obfuscating process is to prevent a fraudulent user from accessing the actual keys, which are used for the validation process. To obfuscate your encryption keys, go to *Window > Unity IAP > Receipt Validation Obfuscator*.

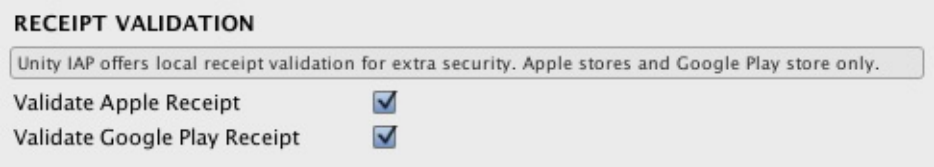


In the opened **IAP Obfuscator** window, paste in your Google Play public key and hit the *Obfuscate secrets* button. According to Unity documentation, this will obfuscate both Apple's root certificate (bundle with Unity IAP) and the provided Google Play public key and create two C# files AppleTangle and GooglePlayTangle at *Assets/Plugins/UnityPurchasing/generated*. These files are required for the receipt validation process.

> To obtain the Google Play public key for your app, login to your Google Play Developer Console, select your app, then navigate to the **Services & APIs** section and find your key under the section labeled **YOUR LICENSE KEY FOR THIS APPLICATION**.
>
> Note that you don't need to provide a Google Play public key if you're only targeting Apple stores.

Enable Receipt Validation

After creating the obfuscated encryption keys, you can now enable receipt validation for your game. Open the In-App Purchasing module settings, then in the **RECEIPT VALIDATION** section check the corresponding options for your targeted stores.

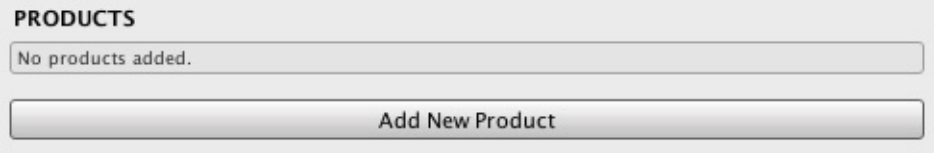


Product Management

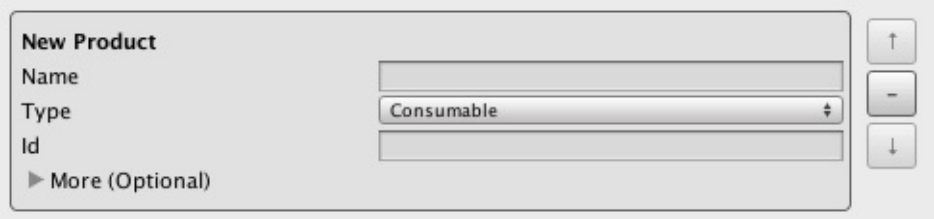
In the **PRODUCTS** section you can easily add, edit or remove your IAP products.

Add a New Product

To add a new product, click the *Add New Product* button.



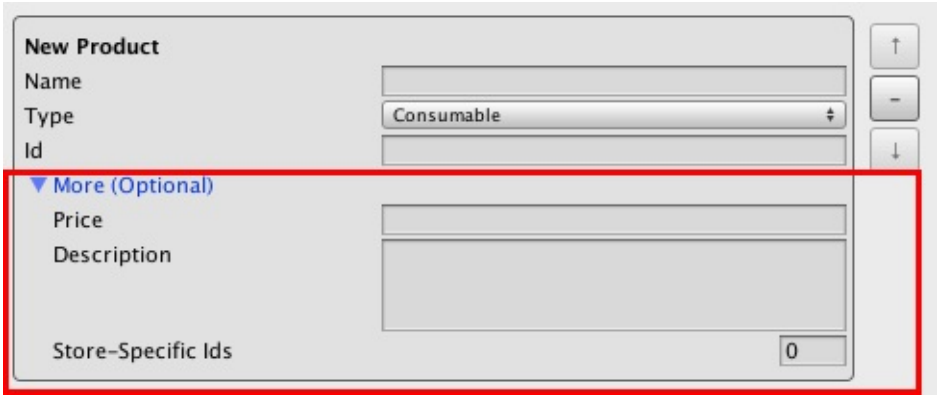
A new empty product will be added.



Fill in the required information for your new product:

- *Name*: the product name, can be used when making purchases
- *Type*: the product type, can be Consumable, Non-Consumable or Subscription
- *Id*: the unified product identifier, you should use this ID when declaring the product on your targeted stores; otherwise, if you need to have a different ID for this product on a certain store, add it to the *Store-Specific Ids* array (see below)

Click *More* if you need to enter store-specific IDs or fill in optional information for your product.

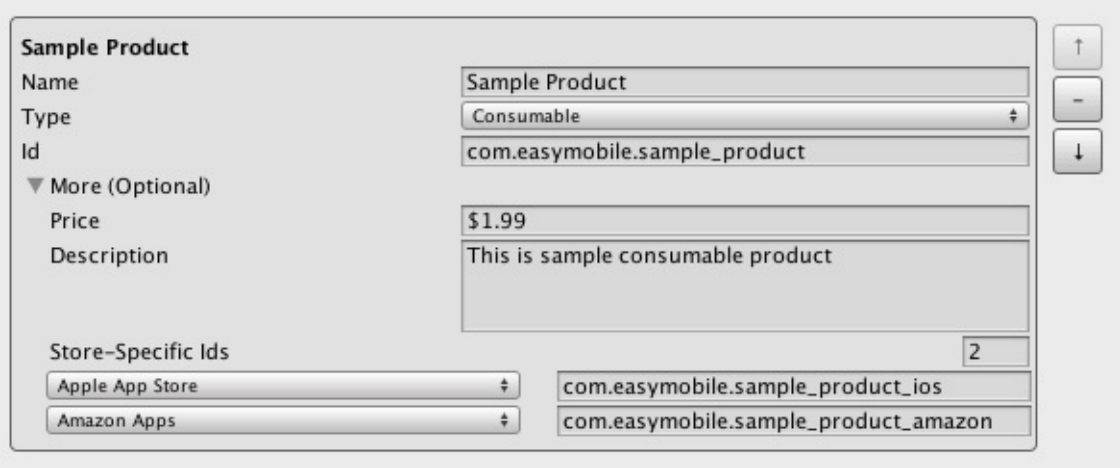


- *Price*: the product price string for displaying purpose
- *Description*: the product description for displaying purpose

- *Store-Specific Ids*: if you need to use a different product ID (than the unified ID provided above) on a certain store, you can add it here

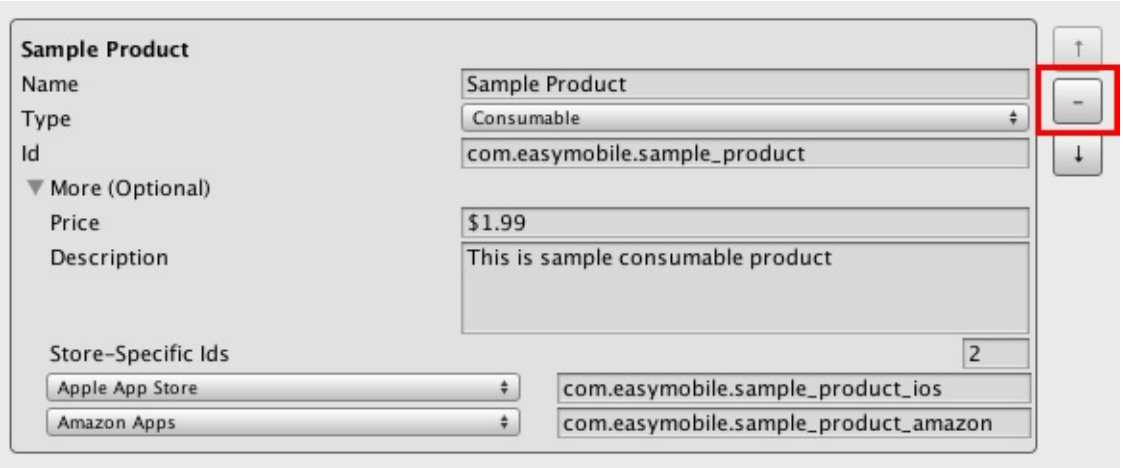
> **Adding Store-Specific ID**
> To add a new ID to the *Store-Specific Ids* array, increase the array size by adjusting the number in the right-hand side box. A new record will be added where you can select the targeted store and enter the corresponding product ID for that store.

Below is a sample product with all the information entered including the two store-specific IDs.



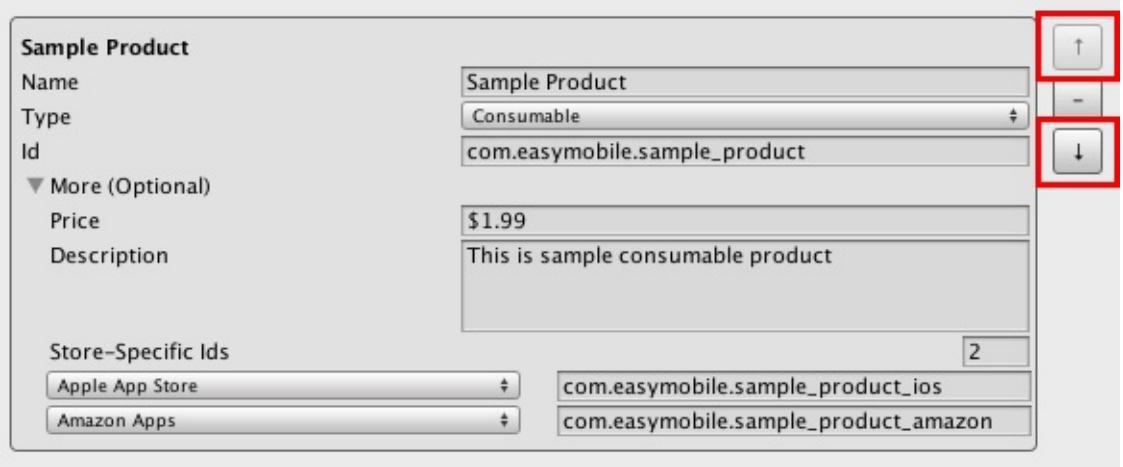
Remove a Product

To remove a product, simply click the [-] button at the right hand side.



Arrange Product List

You can use the two arrow-up and arrow-down buttons to move a product upward or downward within the product list.



Setup Products for Targeted Stores

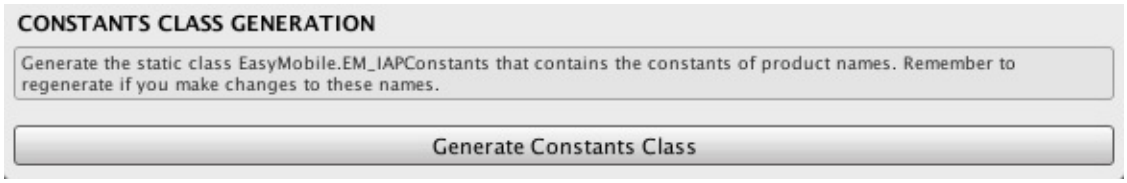
Beside creating the product list in Unity, you also need to declare similar products for your targeted stores, e.g. if you're targeting iOS App Store you need to create the products in iTunes Connect. If you're not familiar with the process, you can follow Unity's instructions on configuring IAP for various stores, which also include useful information about IAP testing.

> On Google Play store, both consumable and non-consumable products are defined as Managed product. If a product is set to Consumable type in Unity, the module will automatically handle the consumption of the product once it is bought and make it available for purchase again.

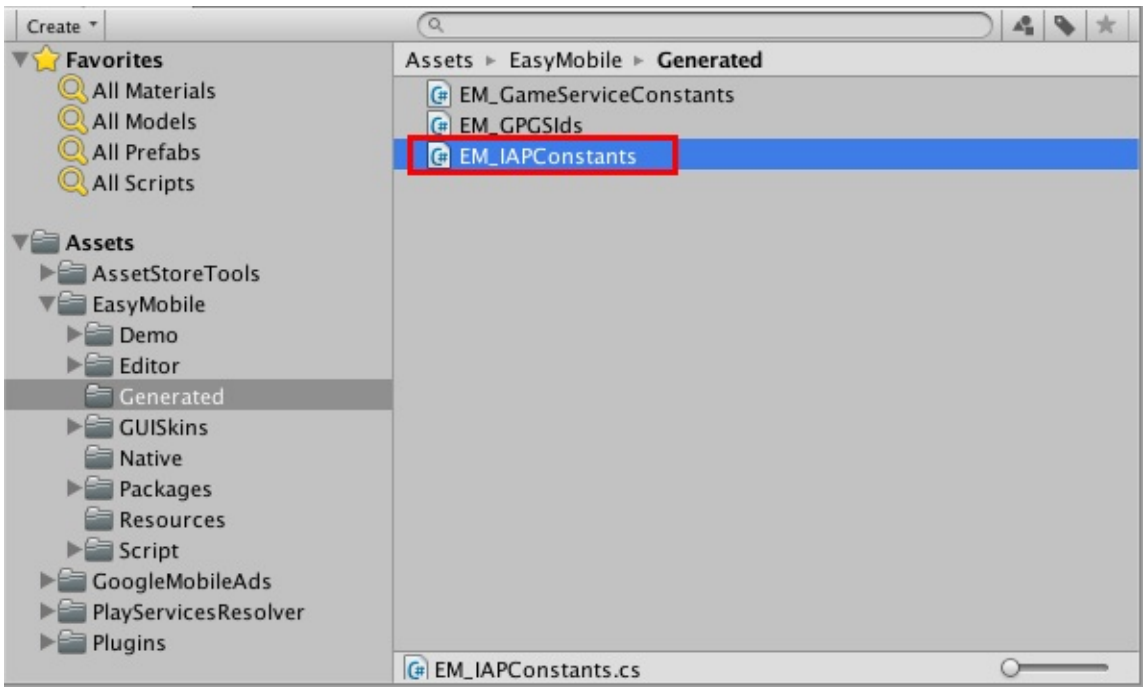
IAP Constants Generation

Constants generation is a feature of the In-App Purchasing module. It reads all the product names and generates a static class named EM_IAPConstants that contains the constants of these names. Later, you can use these constants when making purchases in script instead of typing the product names directly, thus help prevent runtime errors due to typos and the likes.

To generate the constants class (you should do this after finishing with product editing), click the *Generate Constants Class* button within the **CONSTANTS CLASS GENERATION** section.



When the process completes, a file named EM_IAPConstants will be created at *Assets/EasyMobile/Generated*.



Scripting

This section provides a guide to work with the In-App Purchasing API.

> You can access all the In-App Purchasing API methods via the IAPManager class under the EasyMobile namespace.

Initialization

The module will automatically initialize Unity IAP at start without you having to do anything. All further API calls can only be made after the initialization has finished. You can check if Unity IAP has been initialized:

```
// Check if Unity IAP has been initialized
bool isInitialized = IAPManager.IsInitialized();
```

Obtain Product List

You can obtain the array of all products created in the module settings interface:

```
// Get the array of all products created in the In-App Purchasing module settings
// IAPProduct is the class representing a product as declared in the module settings
IAPProduct[] products = IAPManager.GetAllIAPProducts();

// Print all product names
foreach (IAPProduct prod in products)
{
    Debug.Log("Product name: " + prod.Name);
}
```

Make a Purchase

You can purchase a product using its name.

> It is strongly recommended that you use the constants of product names in the generated EM_IAPConstants class (see **IAP Constants Generation** section) instead of typing the names directly in order to prevent runtime errors due to typos and the likes.

```
// Purchase a product using its name
// EM_IAPConstants.Sample_Product is the generated name constant of a product named "S
ample Product"
IAPManager.Purchase(EM_IAPConstants.Sample_Product);
```

A *PurchaseCompleted* event will be fired if the purchase is successful, otherwise, a *PurchaseFailed* event will be fired instead. You can listen to these events and take appropriate actions, e.g. grant the user digital goods if the purchase has succeeded.

```
// Subscribe to IAP purchase events
void OnEnable()
{
    IAPManager.PurchaseCompleted += PurchaseCompletedHandler;
    IAPManager.PurchaseFailed += PurchaseFailedHandler;
}

// Unsubscribe when the game object is disabled
void OnDisable()
{
    IAPManager.PurchaseCompleted -= PurchaseCompletedHandler;
    IAPManager.PurchaseFailed -= PurchaseFailedHandler;
}

// Purchase the sample product
public void PurchaseSampleProduct()
{
    // EM_IAPConstants.Sample_Product is the generated name constant of a product name
d "Sample Product"
    IAPManager.Purchase(EM_IAPConstants.Sample_Product);
}

// Successful purchase handler
void PurchaseCompletedHandler(IAPProduct product)
{
    // Compare product name to the generated name constants to determine which product
 was bought
    switch (product.Name)
    {
        case EM_IAPConstants.Sample_Product:
            Debug.Log("Sample_Product was purchased. The user should be granted it now
.");
            break;
        case EM_IAPConstants.Another_Sample_Product:
            Debug.Log("Another_Sample_Product was purchased. The user should be grante
d it now.");
            break;
        // More products here...
    }
}

// Failed purchase handler
void PurchaseFailedHandler(IAPProduct product)
{
    Debug.Log("The purchase of product " + product.Name + " has failed.");
}
```

Check for Product Ownership

You can check if a product is owned by specifying its name. A product is considered "owned" if its receipt exists and passes the receipt validation (if enabled).

```
// Check if the product is owned by the user
// EM_IAPConstants.Sample_Product is the generated name constant of a product named "S
ample Product"
bool isOwned = IAPManager.IsProductOwned(EM_IAPConstants.Sample_Product);
```

> Consumable products' receipts are not persisted between app restarts, therefore this method only returns true for those products in the session they're purchased.
>
> In the case of subscription products, this method simply checks if a product has been bought (subscribed) before and has a receipt. It doesn't check if the subscription is expired or not.

Restore Purchases

Non-consumable and subscription products are restorable. App stores maintain a permanent record of each user's non-consumable and subscription products, so that he or she can be granted these products again when reinstalling your game.

Apple normally requires a *Restore Purchases* button to exist in your game, so that the users can explicitly initiate the purchase restoration process. On other platforms, e.g. Google Play, the restoration is done automatically during the first initialization after reinstallation.

> During the restoration process, a *PurchaseCompleted* event will be fired for each owned product, as if the user has just purchased them again. Therefore you can reuse the same handler to grant the user their products as normal purchases.

On iOS, you can initiate a purchase restoration as below.

```
// Restore purchases. This method only has effect on iOS.
IAPManager.RestorePurchases();
```

A *RestoreCompleted* event will be fired if the restoration is successful, otherwise, a *RestoreFailed* event will be fired instead. Note that these events only mean the success or failure of the restoration itself, while the *PurchaseCompleted* event will be fired for each restored product, as noted earlier. You can listen to these events and take appropriate actions, e.g. inform the user the restoration result.

> The *RestoreCompleted* and *RestoreFailed* events are only raised on iOS.

```
// Subscribe to IAP restore events, these events are fired on iOS only.
void OnEnable()
{
    IAPManager.RestoreCompleted += RestoreCompletedHandler;
    IAPManager.RestoreFailed += RestoreFailedHandler;
}

// Successful restoration handler
void RestoreCompletedHandler()
{
    Debug.Log("All purchases have been restored successfully.");
}

// Failed restoration handler
void RestoreFailedHandler()
{
    Debug.Log("The purchase restoration has failed.");
}

// Unsubscribe
void OnDisable()
{
    IAPManager.RestoreCompleted -= RestoreCompletedHandler;
    IAPManager.RestoreFailed -= RestoreFailedHandler;
}
```

Advanced Scripting

This section describes the methods to accomplish tasks beyond the basic ones such as making purchases or restoring. These tasks include retrieving product localized data, reading product receipts, refreshing receipts, etc.

> Most of the methods described in this section are only available once Easy Mobile's IAP module and Unity IAP service are enabled, which is indicated by the definition of the symbol **EM_UIAP**. Therefore, you should always wrap the use of these methods inside a check for the existing of this symbol.
>
> Also, the types exposed in these methods are only available when the Unity IAP package is imported, and you should include the UnityEngine.Purchasing and UnityEngine.Purchasing.Security namespaces at the top of your script for these types to be recognized.

Get Unity IAP's Product object

The in-app products are represented in Unity IAP by the Product class, which is different from Easy Mobile's IAPProduct class, whose main purpose is for settings and displaying. This Product class is the entry point to access product-related data including its metadata and receipt, which is populated automatically by Unity IAP. To obtain the Product object of an in-app product, call the *GetProduct* method with the product name.

```
#if EM_UIAP
using UnityEngine.Purchasing;
#endif

...

// Obtain the Product object of the sample product and print its data
public void GetSampleProduct()
{
    #if EM_UIAP
    // EM_IAPConstants.Sample_Product is the generated name constant of a product name
d "Sample Product"
    Product sampleProduct = IAPManager.GetProduct(EM_IAPConstants.Sample_Product);

    if (sampleProduct != null)
    {
        Debug.Log("Available To Purchase: " + sampleProduct.availableToPurchase.ToStri
ng());
        if (sampleProduct.hasReceipt)
        {
            Debug.Log("Receipt: " + sampleProduct.receipt);
        }
    }
    #endif
}
```

Get Product Localized Data

You can get a product's metadata retrieved from targeted app stores, e.g. localized title, description and price. This information is particularly useful when building a storefront in your game for displaying the in-app products. To get the localized data of a product, call the *GetProductLocalizedData* and specify the product name. The following example iterates through the product list and retrieve the localized data of each item.

```
#if EM_UIAP
using UnityEngine.Purchasing;
#endif

...

// Iterate through the product list and get the localized data retrieved from the targ
eted app store.
// Note the check for the EM_UIAP symbol.
void PrintProductsMetadata()
{
    #if EM_UIAP
    // Get all products created in the In-App Purchasing module settings
    IAPProduct[] products = EM_Settings.InAppPurchasing.Products;

    foreach (IAPProduct prod in products)
    {
        // Get product localized data.
        ProductMetadata data = IAPManager.GetProductLocalizedData(prod.Name);

        if (data != null)
        {
            Debug.Log("Localized title: " + data.localizedTitle);
            Debug.Log("Localized description: " + data.localizedDescription);
            Debug.Log("Localized price string: " + data.localizedPriceString);
        }
    }
    #endif
}
```

Read Receipts

This sections describes methods to work with receipts. Currently, Unity IAP only supports parsing receipts from Apple stores and Google Play store.

> Note that for the receipt reading methods to work, you need to enable receipt validation feature (see the **Receipt Validation** section).

Apple App Receipt

On iOS, you can get the parsed Apple App Receipt for your app using the *GetAppleAppReceipt* method.

```
#if EM_UIAP
using UnityEngine.Purchasing;
using UnityEngine.Purchasing.Security;
#endif

...

// Read the App Receipt on iOS. Receipt validation is required.
void ReadAppleAppReceipt()
{
    #if EM_UIAP
    if (Application.platform == RuntimePlatform.IPhonePlayer)
    {
        AppleReceipt appReceipt = IAPManager.GetAppleAppReceipt();

        // Print the receipt content.
        if (appReceipt != null)
        {
            Debug.Log("App Version: " + appReceipt.appVersion);
            Debug.Log("Bundle ID: " + appReceipt.bundleID);
            Debug.Log("Number of purchased products: " + appReceipt.inAppPurchaseRecei
pts.Length);
        }
    }
    #endif
}
```

Apple InAppPurchase Receipt

On iOS, you can get the parsed Apple InAppPurchase receipt for a particular product, using the *GetAppleIAPReceipt* method with the name of the product.

```
#if EM_UIAP
using UnityEngine.Purchasing;
using UnityEngine.Purchasing.Security;
#endif

...

// Read the InAppPurchase receipt of the sample product on iOS.
// Receipt validation is required.
void ReadAppleInAppPurchaseReceipt()
{
    #if EM_UIAP
    if (Application.platform == RuntimePlatform.IPhonePlayer)
    {
        // EM_IAPConstants.Sample_Product is the generated name constant of a product
named "Sample Product".
        AppleInAppPurchaseReceipt receipt = IAPManager.GetAppleIAPReceipt(EM_IAPConsta
nts.Sample_Product);

        // Print the receipt content.
        if (receipt != null)
        {
            Debug.Log("Product ID: " + receipt.productID);
            Debug.Log("Original Purchase Date: " + receipt.originalPurchaseDate.ToShor
tDateString());
            Debug.Log("Original Transaction ID: " + receipt.originalTransactionIdentif
ier);
            Debug.Log("Purchase Date: " + receipt.purchaseDate.ToShortDateString());
            Debug.Log("Transaction ID: " + receipt.transactionID);
            Debug.Log("Quantity: " + receipt.quantity);
            Debug.Log("Cancellation Date: " + receipt.cancellationDate.ToShortDateStri
ng());
            Debug.Log("Subscription Expiration Date: " + receipt.subscriptionExpiratio
nDate.ToShortDateString());
        }
    }
    #endif
}
```

Google Play Receipt

On Android, you can get the parse GooglePlay receipt for a particular product, using the *GetGooglePlayReceipt* method with the name of the product.

```
#if EM_UIAP
using UnityEngine.Purchasing;
using UnityEngine.Purchasing.Security;
#endif

...

// Read the GooglePlay receipt of the sample product on Android.
// Receipt validation is required.
void ReadGooglePlayReceipt()
{
    #if EM_UIAP
    if (Application.platform == RuntimePlatform.Android)
    {
        // EM_IAPConstants.Sample_Product is the generated name constant of a product
named "Sample Product".
        GooglePlayReceipt receipt = IAPManager.GetGooglePlayReceipt(EM_IAPConstants.Sa
mple_Product);

        if (receipt != null)
        {
            Debug.Log("Package Name: " + receipt.packageName);
            Debug.Log("Product ID: " + receipt.productID);
            Debug.Log("Purchase Date: " + receipt.purchaseDate.ToShortDateString());
            Debug.Log("Purchase State: " + receipt.purchaseState.ToString());
            Debug.Log("Transaction ID: " + receipt.transactionID);
            Debug.Log("Purchase Token: " + receipt.purchaseToken);
        }
    }
    #endif
}
```

Refresh Apple App Receipt

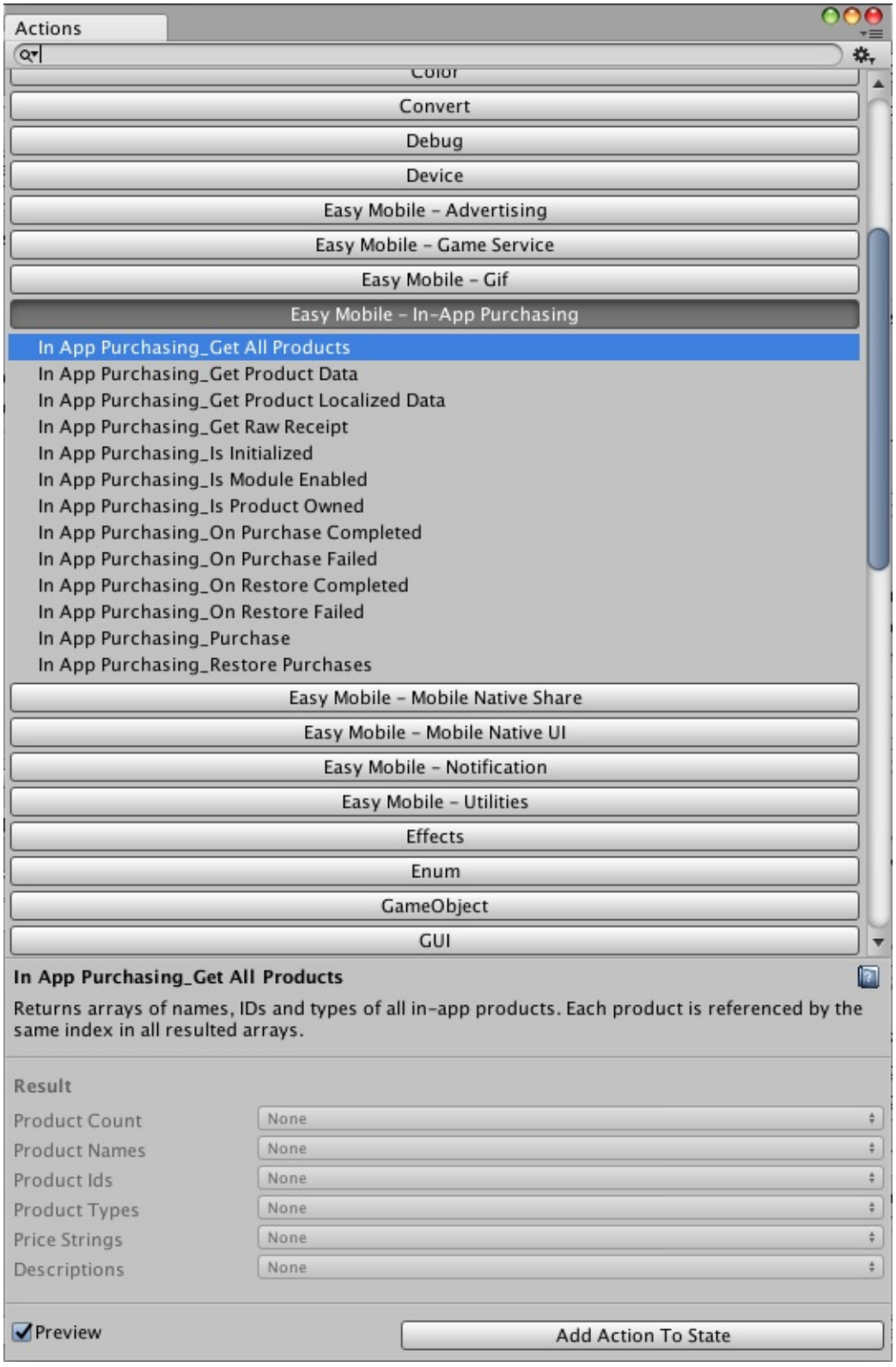
Apple provides a mechanism to fetch a new App Receipt from their servers, typically used when no receipt is currently cached in local storage SKReceiptRefreshRequest. You can refresh the App Receipt on iOS using the *RefreshAppleAppReceipt* method. Note that this will prompt the user for their password.

```
// Fetch a new Apple App Receipt on iOS. This will prompt the user for their password.
void RefreshAppleAppReceipt()
{
    if (Application.platform == RuntimePlatform.IPhonePlayer)
    {
        IAPManager.RefreshAppleAppReceipt(SuccessCallback, ErrorCallback);
    }
}

void SuccessCallback(string receipt)
{
    Debug.Log("App Receipt refreshed successfully. New receipt: " + receipt);
}

void ErrorCallback()
{
    Debug.Log("App Receipt refreshing failed.");
}
```

PlayMaker Actions

The PlayMaker actions of the In-App Purchasing module are group in the category *Easy Mobile - In-App Purchasing* in the PlayMaker's Action Browser.

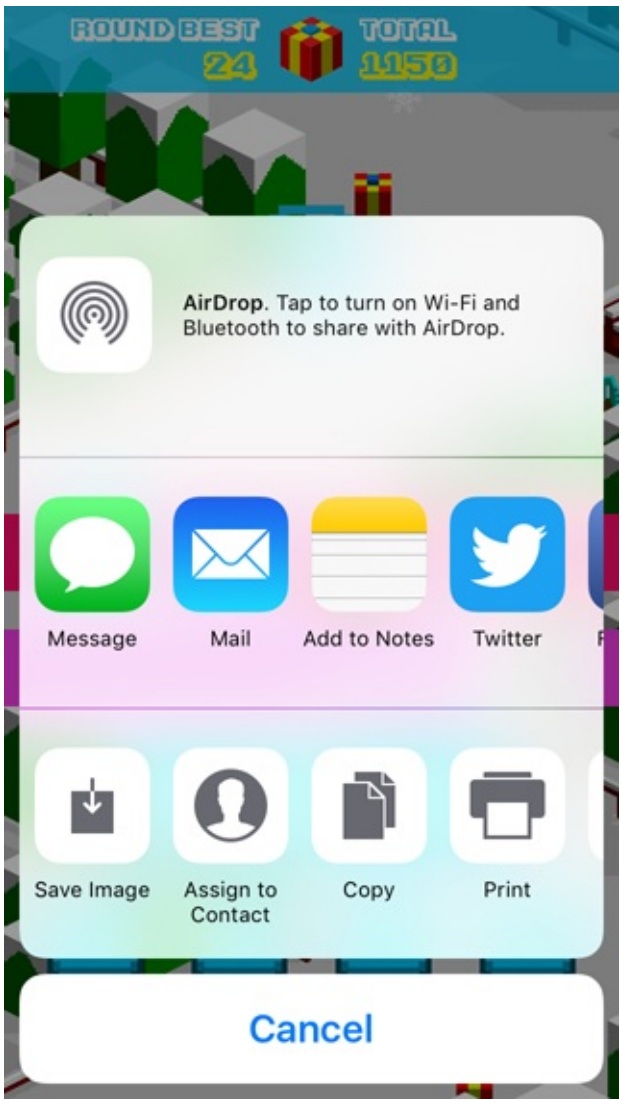
> Please refer to the InAppPurchasingDemo_PlayMaker scene in folder *Assets/EasyMobile/Demo/PlayMakerDemo/Modules* for an example on how these actions can be used.

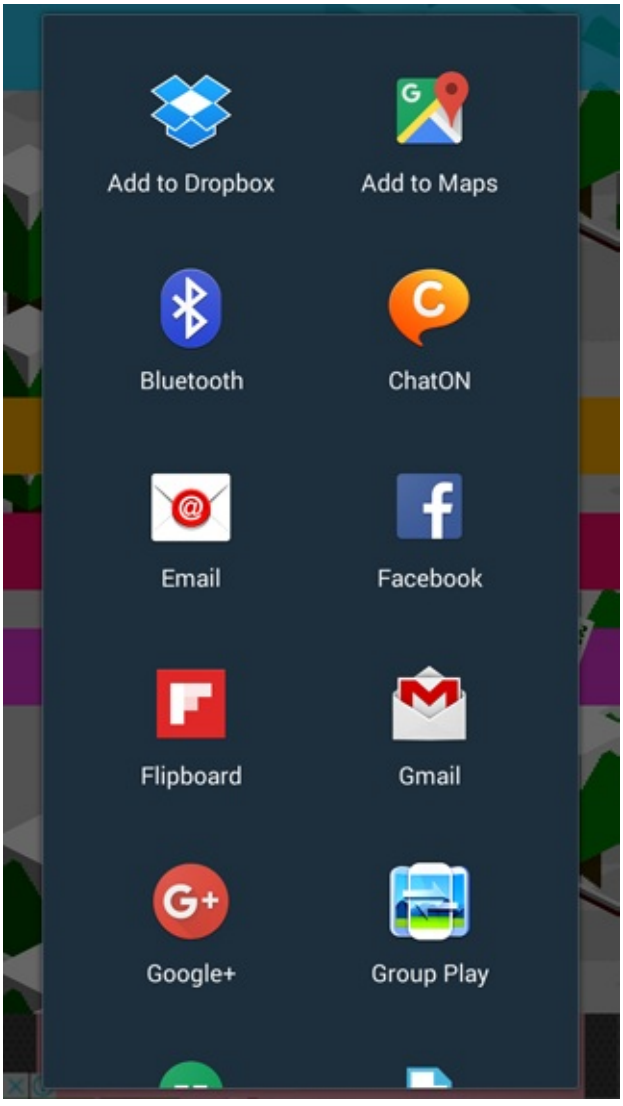

Actions
Color
Convert
Debug
Device
Easy Mobile - Advertising
Easy Mobile - Game Service
Easy Mobile - Gif
Easy Mobile - In-App Purchasing
In App Purchasing_Get All Products
In App Purchasing_Get Product Data
In App Purchasing_Get Product Localized Data
In App Purchasing_Get Raw Receipt
In App Purchasing_Is Initialized
In App Purchasing_Is Module Enabled
In App Purchasing_Is Product Owned
In App Purchasing_On Purchase Completed
In App Purchasing_On Purchase Failed
In App Purchasing_On Restore Completed
In App Purchasing_On Restore Failed
In App Purchasing_Purchase
In App Purchasing_Restore Purchases
Easy Mobile - Mobile Native Share
Easy Mobile - Mobile Native UI
Easy Mobile - Notification
Easy Mobile - Utilities
Effects
Enum
GameObject
GUI
In App Purchasing_Get All Products
Returns arrays of names, IDs and types of all in-app products. Each product is referenced by the same index in all resulted arrays.
Result
Product Count
Product Names
Product Ids
Product Types
Price Strings
Descriptions
None
Preview
Add Action To State

Native Sharing

The Native Sharing module helps you easily share texts and images to social networks including Facebook, Twitter and Google+ using the native sharing functionality. In addition, it also provides convenient methods to capture the screenshots to be shared.

Below are the sharing interfaces on iOS and Android, respectively.

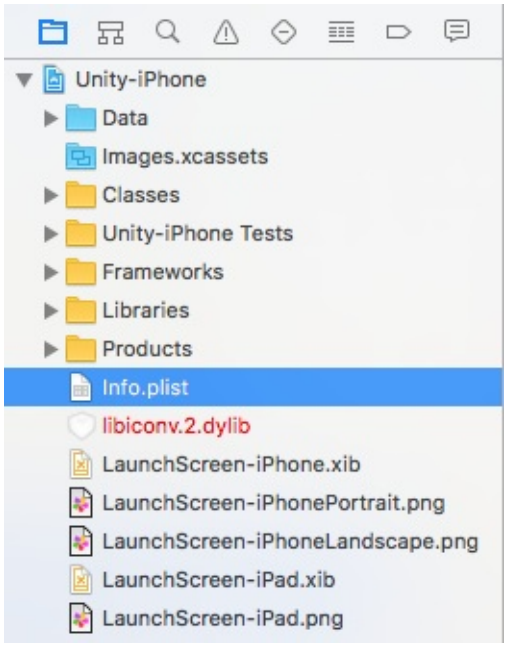




[iOS] Request Photo Library Access Permission

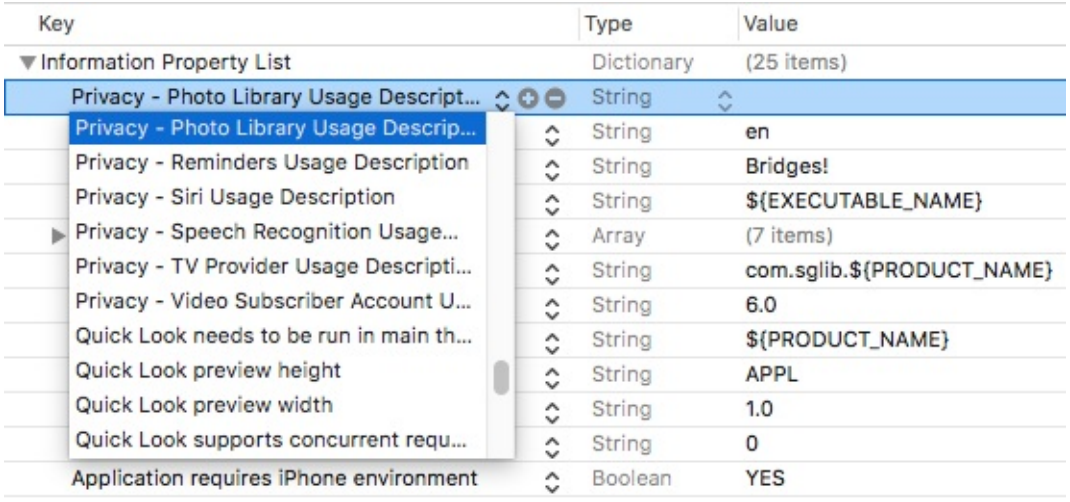
Since iOS 10, in order to use the "Save Image" feature of the sharing utility, the app needs to ask for user permission before it can access the photo library. Failure to do so will cause the app to crash as soon as the user selects the option. To request the photo library access permission, you need to add the **Privacy - Photo Library Usage Description** key to the Info.plist of your Xcode project.

In your generated Xcode project open the Info.plist file.



Click the **+** button on the right of **Information Property List** to add a new key.

Scroll down to find the **Privacy - Photo Library Usage Description** key.

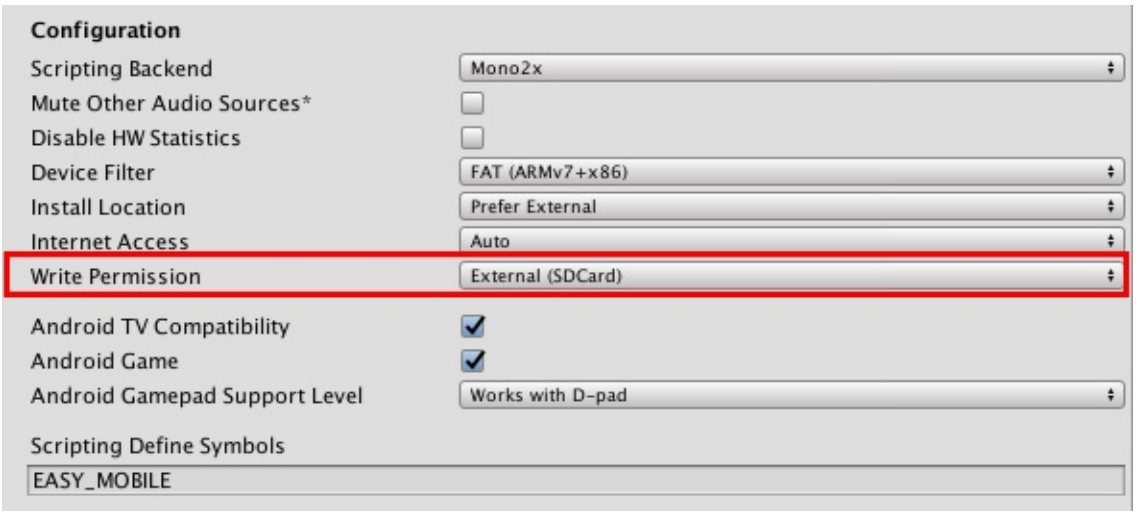


Enter a value for the key, this message will be displayed as the app requests access permission when the user selects the "Save Image" option.

Key	Type	Value
▼ Information Property List	Dictionary	(25 items)
Privacy - Photo Library Usage Descript...	String	This app wants to access the photo library
Localization native development region	String	en
Bundle display name	String	Bridges!
Executable file	String	${EXECUTABLE_NAME}
▶ Icon files	Array	(7 items)
Bundle identifier	String	com.sglib.${PRODUCT_NAME}
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	0

[Android] Enable External Write Permission

For this module to function on Android, it is necessary to enable the permission to write to external storage. To do so, go to *Edit* > *Project Settings* > *Player*, select *Android settings* tab, then locate the **Configuration** section and set the *Write Permission* to *External (SDCard)*.



Scripting

This section provides a guide to work with Native Sharing API.

> You can access all the Native Sharing API methods via the MobileNativeShare class under the EasyMobile namespace.

Capture Screenshots

To capture the device's screenshot, you have a few options.

Capture and Save a Screenshot as PNG Image

To capture and save a screenshot of the whole device screen, simply specify the file name to be saved. This screenshot will be saved as a PNG image in the directory pointed by Application.persistentDataPath. Note that this method, as well as other screenshot capturing methods, needs to be called at the end of a frame (when the rendering has done) for it to produce a proper image. Therefore you should call it within a coroutine after *WaitForEndOfFrame()*.

```
// Coroutine that captures and saves a screenshot
IEnumerator SaveScreenshot()
{
    // Wait until the end of frame
    yield return new WaitForEndOfFrame();

    // The SaveScreenshot() method returns the path of the saved image
    // The provided file name will be added a ".png" extension automatically
    string path = MobileNativeShare.SaveScreenshot("screenshot");
}
```

You can also captures and saves just a portion of the screen:

```
// Coroutine that captures and saves a portion of the screen
IEnumerator SaveScreenshot()
{
    // Wait until the end of frame
    yield return new WaitForEndOfFrame();

    // Capture the portion of the screen starting at (50, 50),
    // has a width of 200 and a height of 400 pixels.
    string path = MobileNativeShare.SaveScreenshot(50, 50, 200, 400, "screenshot");
}
```

Capture a Screenshot into a Texture2D

In some cases you may want to capture a screenshot and obtain a Texture2D object of it instead of saving to disk, e.g. to create a sprite from the texture and display it in-game.

```
// Coroutine that captures a screenshot and generates a Texture2D object of it
IEnumerator CaptureScreenshot()
{
    // Wait until the end of frame
    yield return new WaitForEndOfFrame();

    // Create a Texture2D object of the screenshot using the CaptureScreenshot() metho
d
    Texture2D texture = MobileNativeShare.CaptureScreenshot();
}
```

Similar to the case above, you can also capture only a portion of the screen.

```
// Coroutine that captures a portion of the screenshot and generates a Texture2D objec
t of it
IEnumerator CaptureScreenshot()
{
    // Wait until the end of frame
    yield return new WaitForEndOfFrame();

    // Create a Texture2D object of the screenshot using the CaptureScreenshot() metho
d
    // The captured portion starts at (50, 50) and has a width of 200, a height of 400
 pixels.
    Texture2D texture = MobileNativeShare.CaptureScreenshot(50, 50, 200, 400);
}
```

> Note that screenshot capturing should be done at the end of the frame.

Sharing

To share an image you also have a few options. You can also attach a message to be shared with the image.

> Due to Facebook policy, pre-filled messages will be ignored when sharing to this network, i.e. sharing messages must be written by the user.

Share a Saved Image

You can share a saved image by specifying its path.

```
// Share a saved image
// Suppose we have a "screenshot.png" image stored in the persistentDataPath,
// we'll construct its path first
string path = System.IO.Path.Combine(Application.persistentDataPath, "screenshot.png")
;

// Share the image with the path, a sample message and an empty subject
MobileNativeShare.ShareImage(path, "This is a sample message");
```

Share a Texture2D

You can also share a Texture2D object obtained some point before the sharing time. Internally, this method will also create a PNG image from the Texture2D, save it to the persistentDataPath, and finally share that image.

```
// Share a Texture2D
// sampleTexture is a Texture2D object captured some time before
// This method saves the texture as a PNG image named "screenshot.png" in persistentDa
taPath,
// then shares it with a sample message and an empty subject
MobileNativeShare.ShareTexture2D(sampleTexture, "screenshot", "This is a sample messag
e");
```

Share a Text

You can share a text-only message using the *ShareText* method. Note that Facebook doesn't allow pre-filled sharing messages, so the text will be discarded when sharing to this particular network.

```
// Share a text
MobileNativeShare.ShareText("Hello from Easy Mobile!");
```

Share a URL

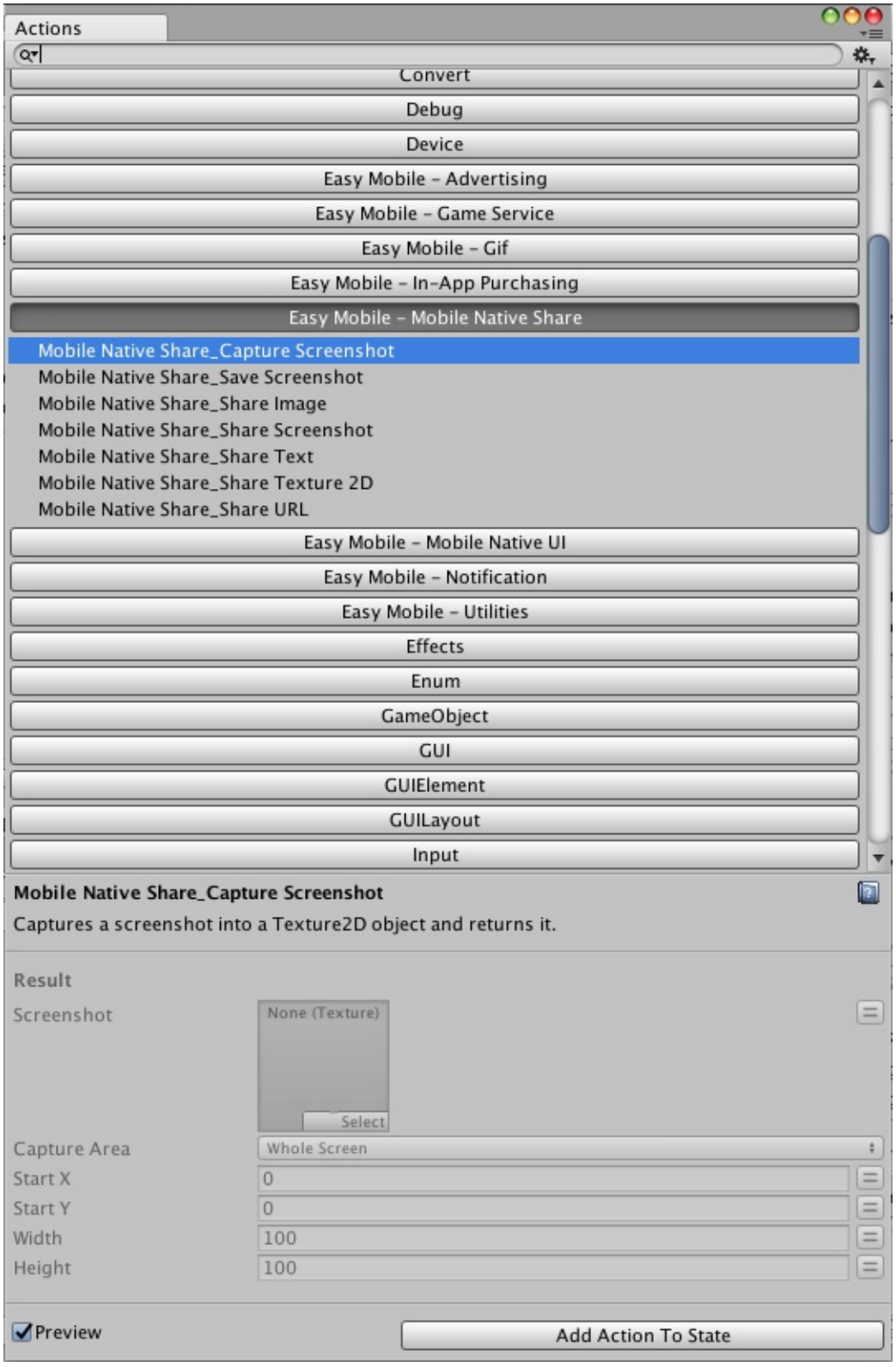
To share a URL, use the *ShareURL* method. On networks like Facebook or Twitter, a summary of the page will be shown if the shared URL points to a website. URLs are also useful to share GIF images hosted on sites like Giphy (see the *GIF > Scripting* section).

```
// Share a URL
MobileNativeShare.ShareURL("www.sglibgames.com");
```

PlayMaker Actions

The PlayMaker actions of the Native Sharing module are group in the category *Easy Mobile - Mobile Native Share* in the PlayMaker's Action Browser.

> Please refer to the MobileNativeShareDemo_PlayMaker scene in folder *Assets/EasyMobile/Demo/PlayMakerDemo/Modules* for an example on how these actions can be used.


Actions
Convert
Debug
Device
Easy Mobile - Advertising
Easy Mobile - Game Service
Easy Mobile - Gif
Easy Mobile - In-App Purchasing
Easy Mobile - Mobile Native Share
Mobile Native Share_Capture Screenshot
Mobile Native Share_Save Screenshot
Mobile Native Share_Share Image
Mobile Native Share_Share Screenshot
Mobile Native Share_Share Text
Mobile Native Share_Share Texture 2D
Mobile Native Share_Share URL
Easy Mobile - Mobile Native UI
Easy Mobile - Notification
Easy Mobile - Utilities
Effects
Enum
GameObject
GUI
GUIElement
GUILayout
Input
Mobile Native Share_Capture Screenshot
Captures a screenshot into a Texture2D object and returns it.
Result
Screenshot
None (Texture)
Select
Capture Area
Whole Screen
Start X
0
Start Y
0
Width
100
Height
100
Preview
Add Action To State

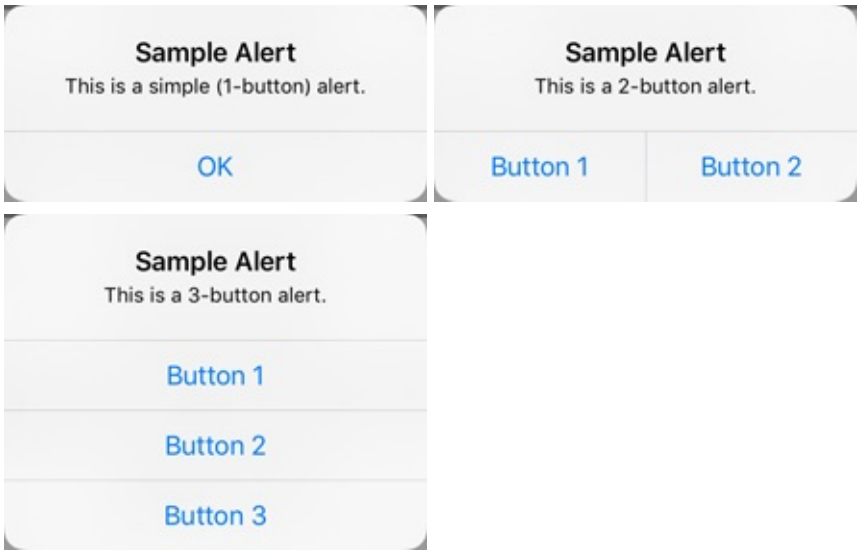
Native UI

The Native UI module allows you to access native mobile UI elements such as alerts and dialogs. This module requires no configuration and all tasks can be done from script.

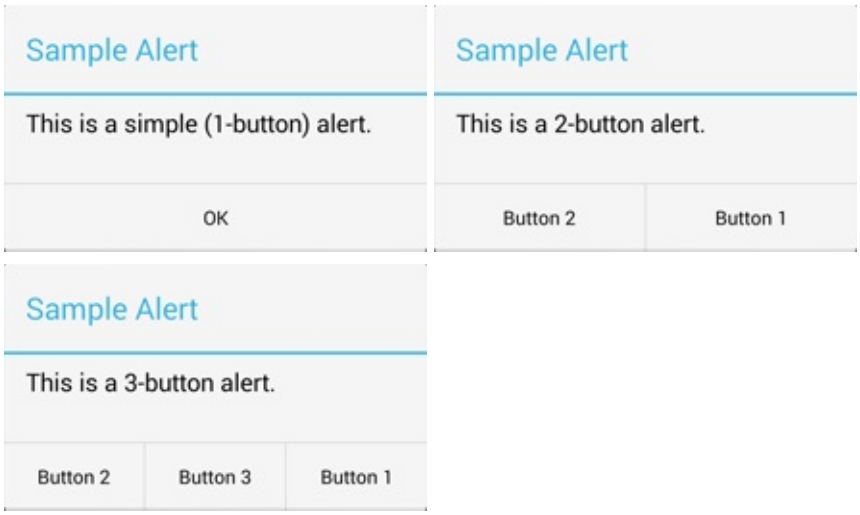
Alerts

Alerts are useful in providing the users contextual information, asking for confirmation or prompting them to make a selection out of several options. An alert can have one, two or three buttons with it.

Below are the three types of alert on iOS.



And below are the three types of alert on Android.



Toasts

Toasts are short messages displayed at the bottom of the screen. They automatically disappear after a timeout. Toasts are available on Android only. Below is a sample toast message.

Scripting

This section provides a guide to work with Native UI API.

> You can access all the Native UI API methods via the MobileNativeUI class under the EasyMobile namespace.

Alerts

Alerts are available on both iOS and Android platform and can have up to three buttons.

> Only one alert can be shown at a time.

Simple (one-button) alerts are useful in giving the user contextual information. To show a simple alert with the default OK button, you only need to provide a title and a message for the alert:

```
// Show a simple alert with OK button
MobileNativeAlert alert = MobileNativeUI.Alert("Sample Alert", "This is a sample alert
 with an OK button.");
```

You can also show a one-button alert with a custom button label.

```
// Show an alert with a button labeled as "Got it"
MobileNativeAlert alert = MobileNativeUI.Alert(
    "Sample Alert",
    "This is a sample alert with a custom button.",
    "Got it"
    );
```

Two-button alerts can be useful when needing to ask for user confirmation. To show a two-button alert, you need to specify the labels of these two buttons.

```
// Show a two-button alert with the buttons labeled as "Button 1" & "Button 2"
MobileNativeAlert alert = MobileNativeUI.ShowTwoButtonAlert(
    "Sample Alert",
    "This is a two-button alert.",
    "Button 1",
    "Button 2"
    );
```

Three-button alerts can be used to present the user with several options, a typical usage of it is to implement the Rate Us popup. To show a three-button alert, you need to specify the labels of the three buttons.

```
// Show a three-button alert with the buttons labeled as "Button 1", "Button 2" & "But
ton 3"
MobileNativeAlert alert = MobileNativeUI.ShowThreeButtonAlert(
    "Sample Alert",
    "This is a three-button alert.",
    "Button 1",
    "Button 2",
    "Button 3"
    );
```

Whenever an alert is shown, a *MobileNativeAlert* object is returned, when the alert is closed, this object will fire an *OnComplete* event and then destroy itself. The argument of this event is the index of the clicked button. You should listen to this event and take appropriate action depending on the button selected.

```
// Show a three button alert and handle its OnComplete event
MobileNativeAlert alert = MobileNativeUI.ShowThreeButtonAlert(
    "Sample Alert",
    "This is a three-button alert.",
    "Button 1",
    "Button 2",
    "Button 3"
    );

// Subscribe to the event
if (alert != null)
{
    alert.OnComplete += OnAlertCompleteHandler;
}

// The event handler
void OnAlertCompleteHandler(int buttonIndex)
{
    switch (buttonIndex)
    {
        case 0:
            // Button 1 was clicked
            break;
        case 1:
            // Button 2 was clicked
            break;
        case 2:
            // Button 3 was clicked
            break;
        default:
            break;
    }
}
```

Toasts

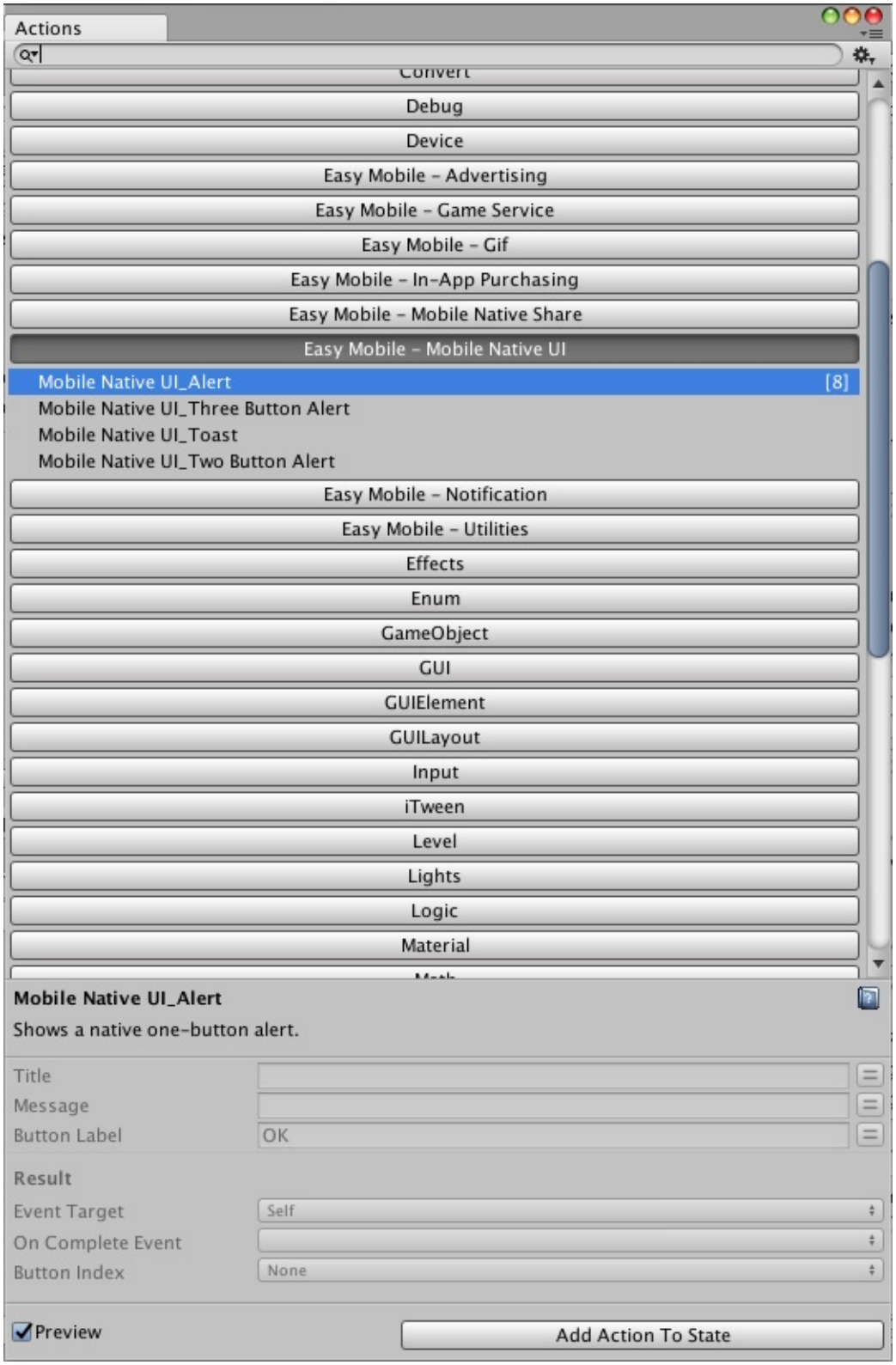
Toast is a short message displayed at the bottom of the screen and automatically disappears after a timeout. Toasts are available only on Android platform. To show a toast message:

```
// Show a sample toast message
MobileNativeUI.ShowToast("This is a sample Android toast");
```

PlayMaker Actions

The PlayMaker actions of the Native UI module are group in the category *Easy Mobile - Mobile Native UI* in the PlayMaker's Action Browser.

> Please refer to the MobileNativeUIDemo_PlayMaker scene in folder *Assets/EasyMobile/Demo/PlayMakerDemo/Modules* for an example on how these actions can be used.

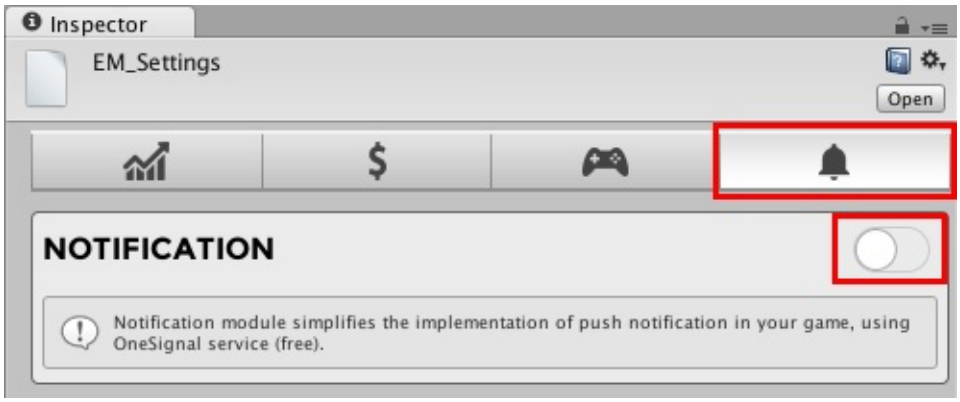

Actions
Debug
Device
Easy Mobile - Advertising
Easy Mobile - Game Service
Easy Mobile - Gif
Easy Mobile - In-App Purchasing
Easy Mobile - Mobile Native Share
Easy Mobile - Mobile Native UI
Mobile Native UI_Alert [8]
Mobile Native UI_Three Button Alert
Mobile Native UI_Toast
Mobile Native UI_Two Button Alert
Easy Mobile - Notification
Easy Mobile - Utilities
Effects
Enum
GameObject
GUI
GUIElement
GUILayout
Input
iTween
Level
Lights
Logic
Material
Mobile Native UI_Alert
Shows a native one-button alert.
Title
Message
Button Label
OK
Result
Event Target
Self
On Complete Event
Button Index
None
Preview
Add Action To State

Notification

The Notification module helps you quickly setup you game for receiving push notifications. It is compatible with OneSignal, a free, popular cross-platform push notification delivery service.

Module Configuration

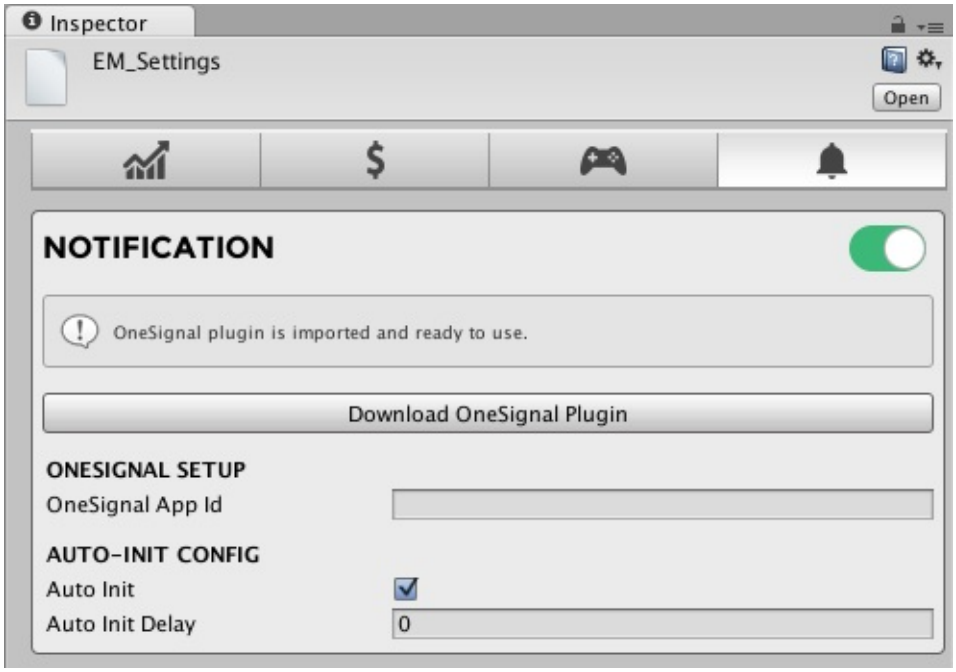
To use the Notification module you must first enable it. Go to *Window* > *Easy Mobile* > *Settings*, select the Notification tab, then click the right-hand side toggle to enable and start configuring the module.



Import OneSignal Plugin

Using OneSignal service requires OneSignal plugin for Unity. Easy Mobile will automatically check for the availability of the plugin and prompt you to import it if needed. Below is the module settings interface when OneSignal plugin hasn't been imported.

Click the *Download OneSignal Plugin* button to open the download page, then download the package and import it to your project. Once the import completes the settings interface will be updated and ready for you to start configuring.



Setup OneSignal

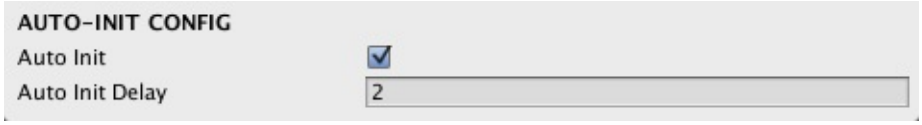
> **Before You Begin**
>
> Before setting up OneSignal in Unity, you must first generate appropriate credentials for your targeted platforms. If you're not familiar with the process, please follow the guides listed here. You should also follow the instructions included in that document on performing necessary setup when building for each platform.

In the **ONESIGNAL SETUP** section, enter your OneSignal App ID.

Auto Initialization

Auto initialization is a feature of the Notification module that initializes the service automatically when the module starts. You can configure this feature in the **AUTO-INIT CONFIG** section.

> On iOS, a popup will appear during the first initialization following the app install to ask for the user's permission to receive push notifications for your game.



- *Auto Init*: uncheck this option to disable the auto initialization feature, you can start the initialization manually from script (see **Scripting** section)

- *Auto Init Delay*: how long after the module start that the initialization should take place

> "Module start" refers to the moment the *Start* method of the module's associated MonoBehavior (attached to the EasyMobile prefab) runs.

Scripting

This section provides a guide to work with the Notification API.

> You can access all the Notification API methods via the NotificationManager class under the EasyMobile namespace.

Initialization

Before receiving push notifications, the service needs to be initialized. This initialization should only be taken once when the app is loaded, and before any other calls to the API are made. If you have enabled the Auto initialization feature (see **Module Configuration** section), you don't need to start the initialization from script. Otherwise, if you choose to disable that feature, you can initialize the service using the *Init* method.

```
// Initialize push notification service
NotificationManager.Init();
```

Note that the initialization should be done early and only once, e.g. you can put it in the *Start* method of a MonoBehaviour, preferably a singleton one so that it won't run again when the scene reloads.

```
// Initialization in the Start method of a MonoBehaviour script
void Start()
{
    // Initialize push notification service
    NotificationManager.Init();

    // Do other stuff...
}
```

The *NotificationOpened* Event

A *NotificationOpened* event will be fired whenever a push notification is opened and your app is put to foreground. You can listen to this event and take appropriate actions, e.g. take the user to the store page of your game to download an update when it's available.

> You should subscribe to this event as early as possible, preferably as soon as your app is loaded, e.g. in the OnEnable method of a MonoBehaviour script in your first scene.

```
// Subscribe to the event
void OnEnable()
{
     NotificationManager.NotificationOpened += OnNotificationOpened;
}

// The event handler
void OnNotificationOpened(string message, string actionID, Dictionary<string, object>
additionalData, bool isAppInFocus)
{
     Debug.Log("Push notification received!");
     Debug.Log("Message: " + message);

     if (additionalData != null)
     {
          // Check if a new update is available, suppose we use
          // a key called "newUpdate" to signal the availability of one
          if (additionalData.ContainsKey("newUpdate"))
          {
               // Here you should ask the users if they want to update
               // and open the download page if they do...
          }
     }
}

// Unsubscribe
void OnDisable()
{
     NotificationManager.NotificationOpened -= OnNotificationOpened;
}
```

Utilities

The Utilities module is added since version 1.0.2 of Easy Mobile as a place to hold useful miscellaneous features. The first feature added to this module is Rating Request.

Rating Request

Ratings and reviews can have a crucial impact on the performance of an app on app stores. Therefore it's a common practice to ask users for ratings when appropriate. This feature gives you an efficient way to do that using a native and highly customizable rating dialog.

This rating dialog has different appearances and behaviors depended on the platform it is being used.

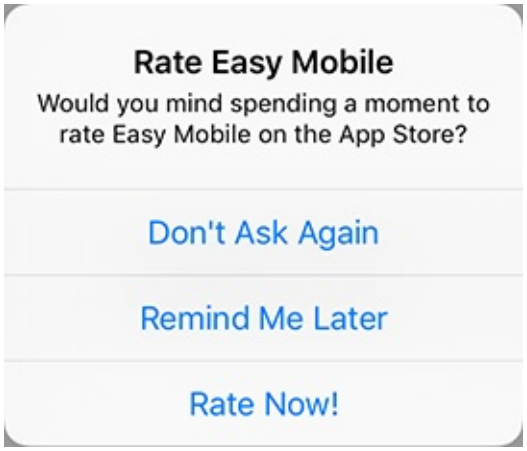
iOS 10.3 and newer

On iOS 10.3 or newer, the system-provided rating dialog is employed. This dialog is built-in to iOS since its 10.3 release, and is the preferred method to solicit user ratings on this platform.

> You can find more information about this built-in rating prompt at https://developer.apple.com/ios/human-interface-guidelines/interaction/ratings-and-reviews/
>
> It's worth noting that the Submit button on this rating popup will be disabled while your app is still in sandbox mode. It will be functioning normally when the app is actually live on App Store.

iOS Before 10.3

On iOS older than 10.3, a typical 3-button alert is used as the rating prompt. This is mainly for backward-compatibility purpose, since the new built-in rating prompt is preferred and will be used on the majority of iOS devices in the near future, given the high adoption rate of new iOS versions.

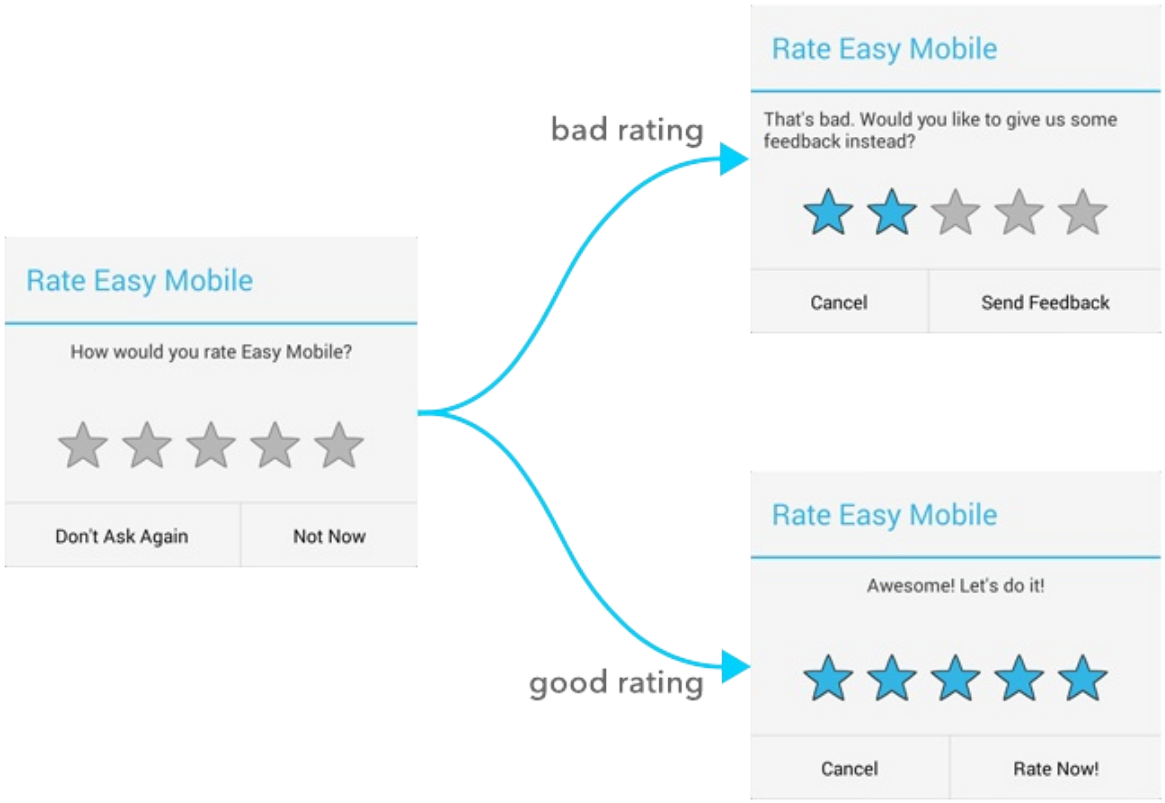


Unlike the built-in dialog, you can customize the title, message and button labels of this alert to suit your needs. The default behavior of this rating prompt is described below.

- *Don't Ask Again*: close and never show this prompt again
- *Remind Me Later*: close this alert
- *Rate Now!*: open the "Write A Review" page of the current app on the App Store, the prompt will never be displayed again

Android

On Android, we built a native, custom alert that employs the RatingBar component to form the rating dialog. The picture below illustrates how this dialog looks and behaves.



The idea is to ask the user how they would rate the app, and the dialog will update itself based on the given rating. You can set a "minimum accepted rating" value, which is the lowest number of stars expected for your app. Any rating lower than this value is considered a bad rating, and vice versa. If the user is giving a good rating, we will take them to the store to do the actual rating and review. Otherwise, we will suggest them to send a feedback to your support email instead. The default behavior of this rating dialog is described below. Again, you can discard this default behavior and implement a custom one if you wish.

- *Don't Ask Again*: close and never show this prompt again
- *Not Now/Cancel*: close this prompt
- *Send Feedback*: open email client for the user to send feedback to your email address
- *Rate Now*!: open the product page of the app on the Google Play Store, the prompt will never be displayed again

> On Android or iOS older than 10.3, you can discard the default behavior of the rating dialog and give your own behavior implementation if you wish.

Display Policy

It is up to you to decide when to show the rating prompt in your game to maximize its effectiveness while maintaining the best user experience. Generally, it is advisable to not annoy the user by asking repeatedly or too frequently. For that purpose, the rating request feature provides a few general constraints to help regulate the display of the rating prompt. You are free to configure these values appropriately to suit your needs. These constraints include:

- *Annual Cap*: the maxium number of requests allowed each year
- *Delay After Installation*: the required waiting time (days) since app installation before the first rating request can be made
- *Cooling-Off Period*: the minimum interval (days) required between two consecutive requests

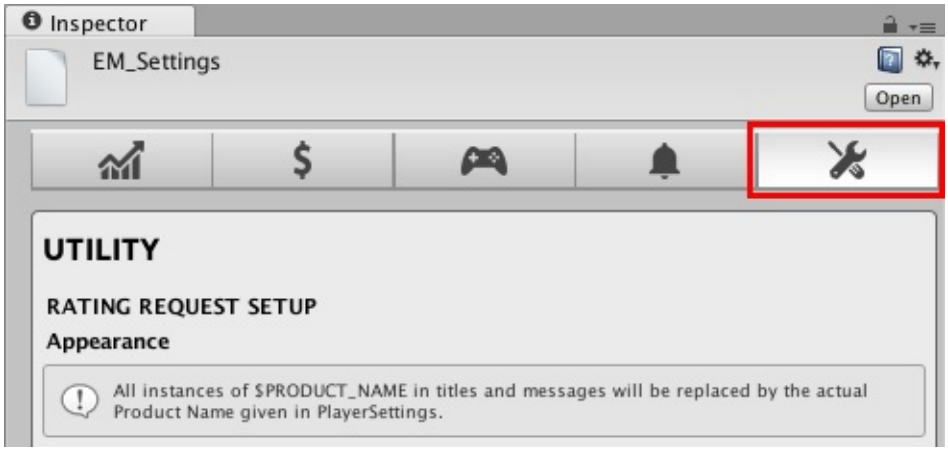
> On iOS 10.3 and newer (where the built-in rating prompt is used), the *Annual Cap* is overwritten by the OS and will always be set to 3.
>
> For the *Delay After Installation* constraint to function properly, it is required that an instance of the EasyMobile prefab is added to the first scene of your game (so that it can record the installation timestamp).

Dialog Content and Localization

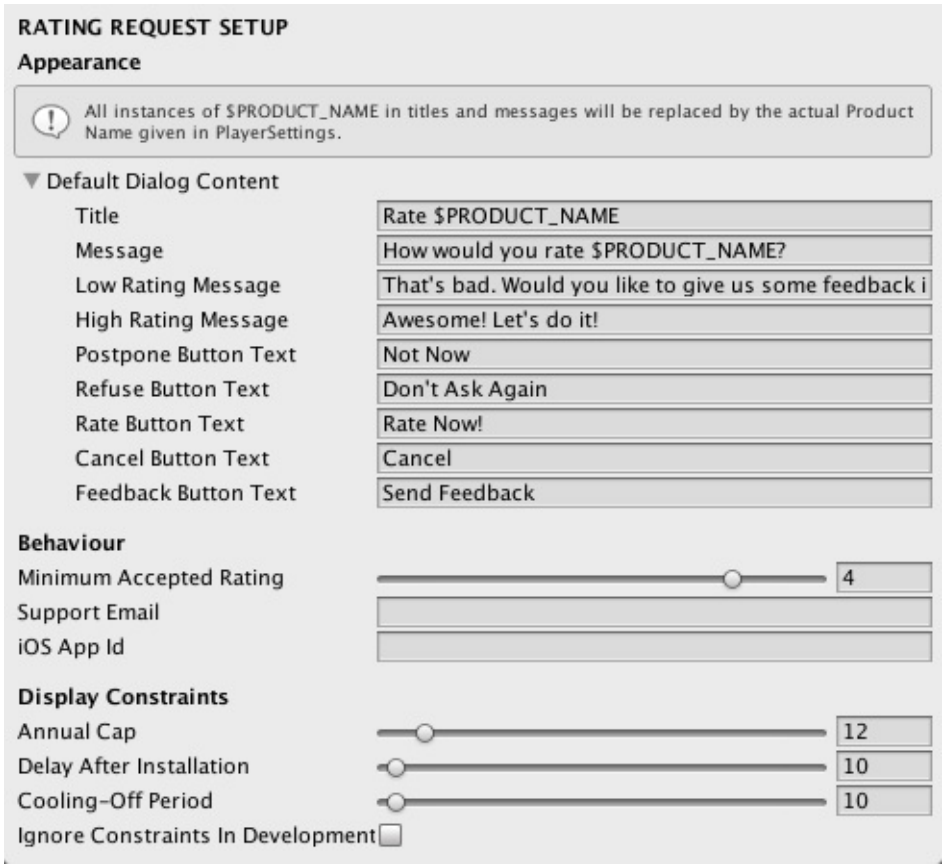
The default content (texts) of the rating dialog can be entered in the settings UI (see the **Configuration** section). This content can be altered in runtime (see the **Scripting** section), so that you can use this feature in conjunction with another localization plugin to fully localize your popup.

Configuration

You can configure the Rating Request feature from the Utility module. Go to *Window* > *Easy Mobile* > *Settings*, then select the Utility tab to reveal it.



In the **RATING REQUEST SETUP** section, you can customize the appearance, behavior and display constraints of the rating dialog.



- *Default Dialog Content*: the default texts of the rating dialog used on Android and iOS older than 10.3 (on iOS 10.3 or newer this content is governed by the system)
- *Minimum Accepted Rating*: the lowest number of stars required to be considered as a

good rating, you can set it to 0 to disable the feedback feature (accept all ratings); *note that this is only applicable on Android*
- *Support Email*: your email address for receiving feedback
- *iOS App Id*: your app Id on the Apple App Store, this is required to open the review page of the app on iOS older than 10.3
- *Annual Cap*: the maxium number of requests allowed each year
- *Delay After Installation*: the required waiting time (days) since app installation before the first rating request can be made
- *Cooling-Off Period*: the minimum interval (days) required between two consecutive requests
- *Ignore Constraints In Development*: ignore all display constraints so the rating popup can be shown every time in Development builds (unless it was disabled before)

Scripting

This section provides a guide to work with the Request Rating API.

> You can access all the Request Rating API methods via the MobileNativeRatingRequest class under the EasyMobile namespace.

Request Rating

To show the rating dialog using its default content and retain its default behavior, use the *RequestRating* method without any parameter. Note that this method is a no-op if the rating dialog has been disabled, or one of display constraints is not satisfied. You should call this method when it makes sense in the experience flow of your app, to maximize the effectiveness of the request.

> On iOS 10.3 or newer, the actual display of the rating dialog is governed by App Store policy. When your app is still in sandbox/development mode, the dialog is always displayed for testing purpose. However, it won't be shown in an app that you distribute using TestFlight.

```
// Show the rating dialog with default behavior
MobileNativeRatingRequest.RequestRating();
```

To check if the rating dialog has been disabled (because the user selected *Don't Ask Again* or already gave a rating):

```
// Check if the rating dialog has been disabled
bool isDisabled = MobileNativeRatingRequest.IsRatingRequestDisabled();
```

To get the number of used and remaining requests in the current year:

```
// Get the number of requests used this year
int usedRequests = MobileNativeRatingRequest.GetThisYearUsedRequests();

// Get the number of unused requests this year
int unusedRequests = MobileNativeRatingRequest.GetThisYearRemainingRequests();
```

To get the timestamp of the last request:

```
// Get the time when the last rating popup is shown
DateTime lastTime = MobileNativeRatingRequest.GetLastRequestTimestamp();
```

To check if it's eligible to show the rating dialog (which means it hasn't been disabled and all display constraints are satisfied):

```
// Check if it's eligible to show the rating dialog and then show it
if (MobileNativeRatingRequest.CanRequestRating())
{
    MobileNativeRatingRequest.RequestRating();
}
```

Localize the Rating Dialog

To localize the content of the rating dialog, simply create a new RatingDialogContent to hold the translated texts (which you may obtain from a standard localization plugin), and pass it to the *RequestRating* method.

```
// Create a RatingDialogContent object to hold the translated content of the dialog
var localized = new RatingDialogContent(
            YOUR_LOCALIZED_TITLE + RatingDialogContent.PRODUCT_NAME_PLACEHOLDER,
            YOUR_LOCALIZED_MESSAGE + RatingDialogContent.PRODUCT_NAME_PLACEHOLDER + "?
",
            YOUR_LOCALIZED_LOW_RATING_MESSAGE,
            YOUR_LOCALIZED_HIGH_RATING_MESSAGE,
            YOUR_LOCALIZED_POSTPONE_BUTTON_LABEL,
            YOUR_LOCALIZED_REFUSE_BUTTON_LABEL,
            YOUR_LOCALIZED_RATE_BUTTON_LABEL,
            YOUR_LOCALIZED_CANCEL_BUTTON_LABEL,
            YOUR_LOCALIZED_FEEDBACK_BUTTON_LABEL
        );

// Show the rating popup with the localized texts
MobileNativeRatingRequest.RequestRating(localized);
```

> Any instance of RatingDialogContent.PRODUCT_NAME_PLACEHOLDER (literal value "$PRODUCT_NAME") will be automatically replaced by the actual product name (given in PlayerSettings) by the *RequestRating* method.

Request Rating with Custom Behavior

On Android or iOS older than 10.3, you can discard the default behavior of the rating dialog and provide your own implementation to suit your needs (again, on iOS 10.3 or newer we employ the native rating prompt whose behavior is governed by the system itself). This can

be useful in cases when you want to perform additional tasks like recording the number of users who gave good ratings (maybe for analytics purpose). To do so, simply call the *RequestRating* method passing a callback in which the custom behavior is implemented. This callback takes as input an enum value representing the user action, which you can use to decide whatever action should be taken. Note that you can use the *DisableRatingRequest* method to prevent the rating dialog from being displayed in the future, if the user selects "Don't Ask Again" option. Also note that you can pass a *null* RatingDialogContent object to use the default content, otherwise create a new object as described in the **Localized the Rating Dialog** section above.

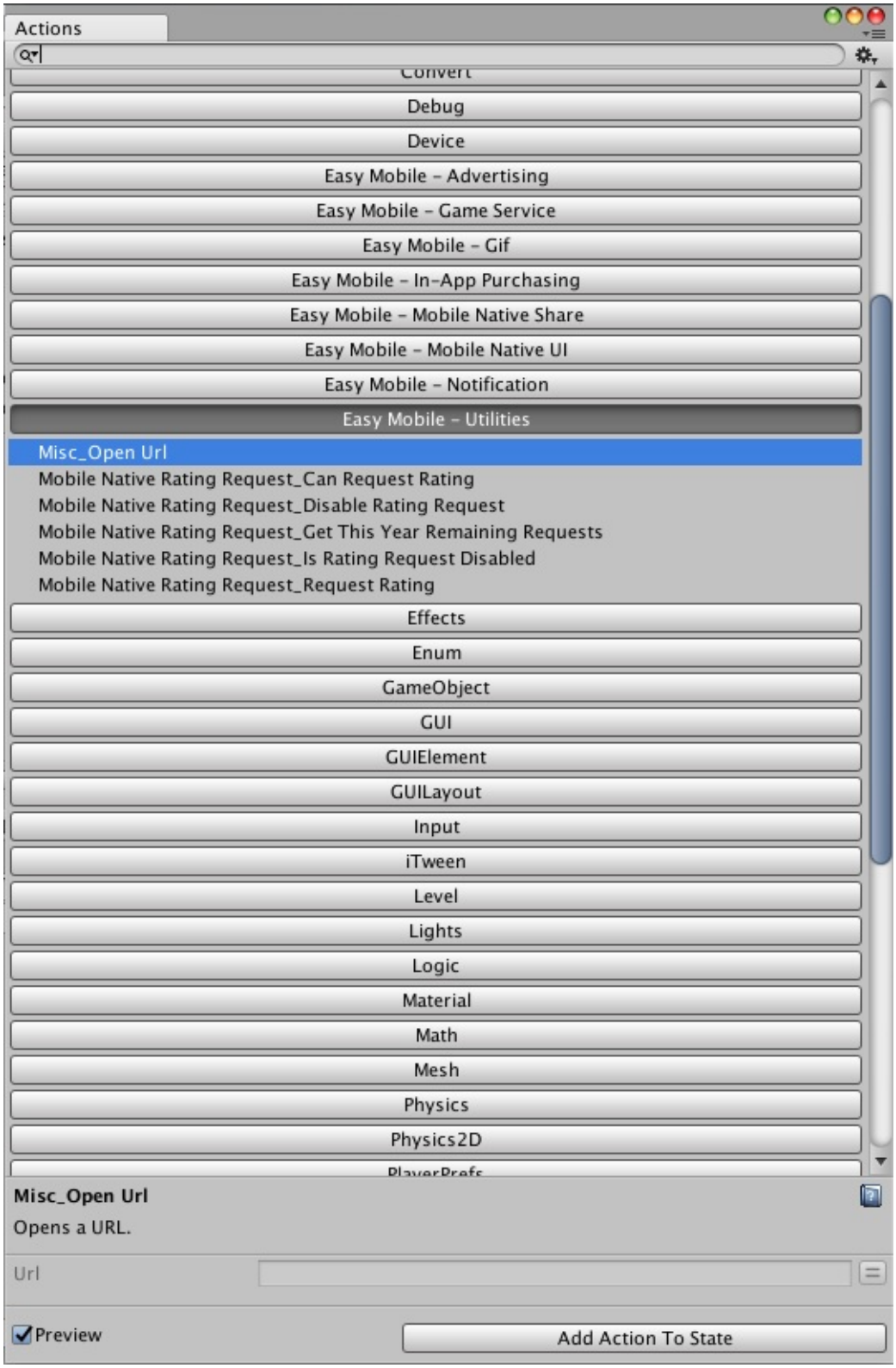
> From the analytics point of view, it's worth noting that the rating given in the rating dialog on Android is merely *a suggestion of how the user would rate the app*. There's currently no reliable way to verify if it is the actual rating given on the app stores or not.

```
// Show rating dialog with a callback for custom behavior
// Passing null for the RatingDialogContent parameter to use the default content
MobileNativeRatingRequest.RequestRating(null, RatingCallback);

// The rating callback
private void RatingCallback(MobileNativeRatingRequest.UserAction action)
{
    switch (action)
    {
        case MobileNativeRatingRequest.UserAction.Refuse:
            // Don't ask again. Disable the rating dialog
            // to prevent it from being shown in the future.
            MobileNativeRatingRequest.DisableRatingRequest();
            break;
        case MobileNativeRatingRequest.UserAction.Postpone:
            // User selects Not Now/Cancel button.
            // The dialog automatically closes.
            break;
        case MobileNativeRatingRequest.UserAction.Feedback:
            // Bad rating, user opts to send feedback email.
            break;
        case MobileNativeRatingRequest.UserAction.Rate:
            // Good rating, user wants to rate.
            break;
    }
}
```

PlayMaker Actions

The PlayMaker actions of the Utilities module are group in the category *Easy Mobile - Utilities* in the PlayMaker's Action Browser.

> Please refer to the UtilitiesDemo_PlayMaker scene in folder *Assets/EasyMobile/Demo/PlayMakerDemo/Modules* for an example on how these actions can be used.


Actions
Debug
Device
Easy Mobile - Advertising
Easy Mobile - Game Service
Easy Mobile - Gif
Easy Mobile - In-App Purchasing
Easy Mobile - Mobile Native Share
Easy Mobile - Mobile Native UI
Easy Mobile - Notification
Easy Mobile - Utilities
Misc_Open Url
Mobile Native Rating Request_Can Request Rating
Mobile Native Rating Request_Disable Rating Request
Mobile Native Rating Request_Get This Year Remaining Requests
Mobile Native Rating Request_Is Rating Request Disabled
Mobile Native Rating Request_Request Rating
Effects
Enum
GameObject
GUI
GUIElement
GUILayout
Input
iTween
Level
Lights
Logic
Material
Math
Mesh
Physics
Physics2D
Misc_Open Url
Opens a URL.
Url
Preview
Add Action To State

Release Notes

Version 1.1.5

New Features

- **Editor:**
  - Incorporated the Google Play Services Resolver for Unity plugin for Android dependencies management.
  - Added the **Import Play Services Resolver** item to Easy Mobile menu for manual import of this resolver if needed (normally it will be imported automatically upon importing Easy Mobile)

Changes

- **Editor:**
  - Easy Mobile's native code is now statically included in folder Assets/EasyMobile/Plugins folder, rather than being imported automatically from script into Assets/Plugins folder as before. This enhances the plugin's robustness as it prevents build errors due to unintended removal of plugin files in the Assets/Plugins folder.
  - Removed the **Reimport Native Package** item from Easy Mobile menu (as a result of the above change).

Bug Fixes

- **Native Sharing module:**
  - Fixed a bug causing image sharing to fail on Android 7 (Nougat) and above. Image sharing on these platforms now uses FileProvider to comply with the new Android security requirements.

Notes

** Since the plugin structure changes quite a lot in this version, you need to do some cleanup before importing the new plugin. Please see the **Upgrade Guide** section for more details.*

Version 1.1.4b

Changes

- **GIF module:**
  - Optimized memory usage when exporting GIF.

Version 1.1.4a

Bug Fixes

- **In-App Purchasing module:**
  - Updated editor scripts to be compatible with UnityIAP version 1.14.0.

Notes

** If you're upgrading Easy Mobile from an existing project that uses IAP module, you need to upgrade (re-import) UnityIAP package too. Please see the **Upgrade Guide** section for more details.*

Version 1.1.4

New Features

- **Game Service module:**
  - Added a new method to show the UI of a specific leaderboard in an (optional) time scope.
- **In-App Purchasing module:**
  - Added a new method to get all IAP products created in the module settings.
- **Utilities module - Rating Request feature:**
  - Added new display constraints: delay after installation & cooling-off period.
  - Added an option to ignore display constraints while in development mode.
  - Added new methods to get the timestamp of the last request, the number of requests used in the current year, etc.

    - Added the ability to update the dialog content in runtime for localization purposes (see the user guide for details).

- **Editor:**
    - [Android] leaderboard & achievement IDs are now sorted alphabetically in the settings UI.
    - We've now got a little cute About window where you can quickly find out the version of your Easy Mobile :)

Changes

- **Game Service module:**
    - *UserAuthenticated* event is now officially removed.

Version 1.1.3

New Features

- **Introducing brand new PlayMaker actions!**
    - Easy Mobile is now compatible with PlayMaker, starting with nearly 100 custom actions covering all modules!
- **Utilities module:**
    - Added new method GetAnnualRequestLimit to get the annual cap of the rating request popup from script

Changes

- **Game Service module:**
    - Added optional callback to ReportScore, RevealAchievement, UnlockAchievement & ReportAchievementProgress to acknowledge if the operation succeeds or not

Bug Fixes

- **Editor:**
    - Fixed a bug on Unity 5.6+ causing EasyMobile prefab instance to not be detected properly if the containing scene is not active -> a false **"Easy Mobile Instance Not Found"** alert is shown before building

Version 1.1.2

Changes

- **In-App Purchasing module:**
  - Updated the receipt validation method to handle cases when the input receipt is null or empty.

Version 1.1.1

New Features

- **In-App Purchasing module:**
  - Added new methods to read receipts from Apple stores and Google Play store
  - Added a new method to refresh Apple App Receipt

Version 1.1.0

This is a major release with many new features and improvements!

New Features

- **Introducing brand new module GIF!**
  - Low overhead screen/camera recorder
  - Built-in players for playback of recorded clips
  - High performance, mobile-friendly GIF image generator
  - Giphy upload API for sharing GIF images to social networks
- **Native Sharing module:**
  - Added *ShareText* and *ShareURL* methods to *MobileNativeShare* class
- **Editor:**
  - Added a new context menu for creating EasyMobile instance and other built-in objects in the Hierarchy window
  - Added new item **Reimport Native Package** to Easy Mobile menu

- [Unity 5.6+] Added a warning popup which is shown when an iOS or Android build starts while no EasyMobile instance was added to any scene

---

Version 1.0.4

New Features

- **Game Service module:**
  - Added *SignOut* method to *GameServiceManager* class.

Version 1.0.3

This update introduces important improvements and bug fixes.

New Features

- **Advertising module:**
  - AdMob rewarded ad is now supported
  - Added support for new ad network: **AdColony**

Changes

- **Advertising module:**
  - Ad events are now raised from main thread when using AdMob
  - *RewardedAdCompleted* event is now raised after the ad is closed, to ensure a consistent behavior across different ad networks

Bug Fixes

- **Native Sharing module:**
  - Fixed a potential memory leak issue caused by the *SaveScreenshot* method of the *MobileNativeShare* class

---

Version 1.0.2

New Features

- **Introducing whole new module Utilities:**
    - The first feature of this module is **Rating Request**, an effective way to ask for rating using a native and highly customizable "rate my app" popup.
- **Game Service module:**
    - Updated *GameServiceManager* class, introducing new events *UserLoginSucceeded* and *UserLoginFailed*; _UserAuthenticated _event is now obsolete.

Version 1.0.1

Changes

- **Game Service module:**
    - Updated scripts to be compatible with version 0.9.37 of the Google Play Games plugin for Unity.

Version 1.0.0

First release.

Upgrade Guide

This section describes the required actions you may need to take when upgrading to a certain version. Please visit this place before upgrading Easy Mobile to avoid unnecessary issues.

Upgrading to version 1.1.5 or newer

Since version 1.1.5, Easy Mobile incorporates the Google Play Services Resolver for Unity plugin for Android dependencies management, as well as moves all native code into the Assets/EasyMobile/Plugins folder. If you're upgrading from an older version to version 1.1.5 or newer, please remove the following files before importing the new package to avoid potential issues:

- Assets/Plugins/Android/easy-mobile.aar.
- Assets/Plugins/Android/libs/armeabi-v7a/libeasymobile.so
- Assets/Plugins/Android/libs/x86/libeasymobile.so
- Assets/Plugins/iOS/libEasyMobile.a

Upgrading to version 1.1.4a or newer

Since version 1.14.0, the UnityIAP package has made changes to its API that cause some conflicts with Easy Mobile editor scripts. We addressed this problem in version 1.1.4a. If you're upgrading from an older version to 1.1.4a, and your project uses the In-App Purchasing module, you need to upgrade (re-import) the UnityIAP package to version 1.14.0 or newer to avoid incompatibility issues.

Upgrading to version 1.1.0 or newer

If you're upgrading from an older version to version 1.1.0 or newer, you'll need to:

1. Remove the EasyMobile/Demo folder
2. Remove the EasyMobile/Script folder
3. Import the new version

Troubleshooting

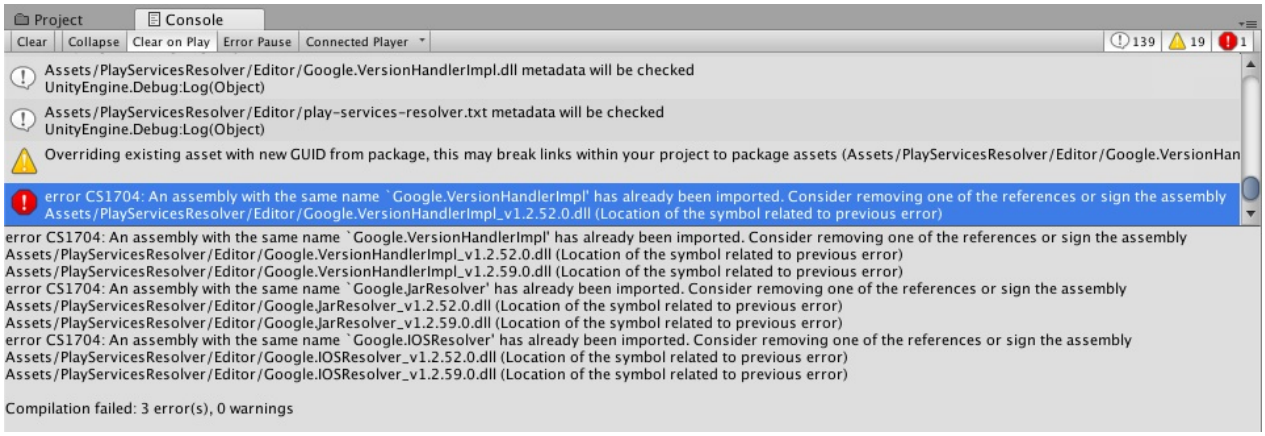
This section is for known issues and their solutions.

Errors upon importing Easy Mobile due to conflicting versions of the Google Play Services Resolver plugin

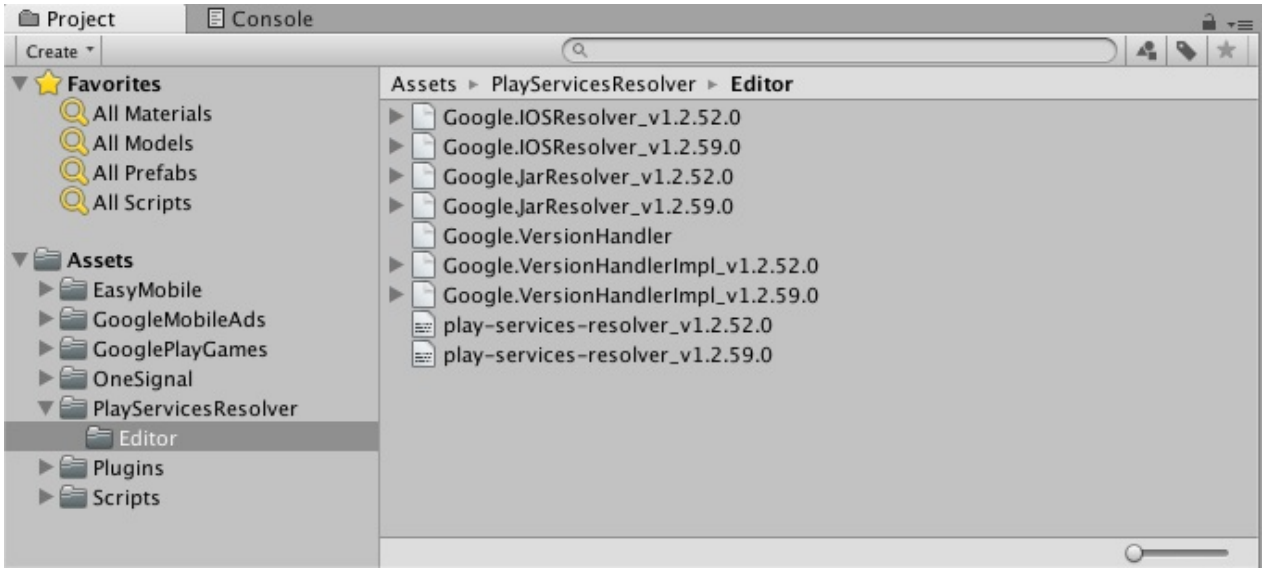
Symptoms

After importing/upgrading Easy Mobile in a project that already contains the Google Play Services Resolver plugin (the folder Assets/PlayServicesResolver exists):

- You get an error in the console starting with **"An assembly with the same name 'Google.VersionHandlerImpl' has already been imported..."**.



- The Assets/PlayServicesResolver/Editor contains multiple files with same names but different versions.



Solution

Use menu *Assets* > *PlayServicesResolver* > *Version Handler* > *Update*. The Version Handler of the Google Play Services Resolver will automatically resolve the conflict, pick the appropriate version and remove the redundant files.