

## Unity AR 擴增實境 – Vuforia

擴增實境 ( AR, Augmented Reality ) 是一種結合影像辨識與 3D 即時算圖的技術，Unity AR 將搭配 Vuforia 介紹開發行動裝置的 AR 遊戲。

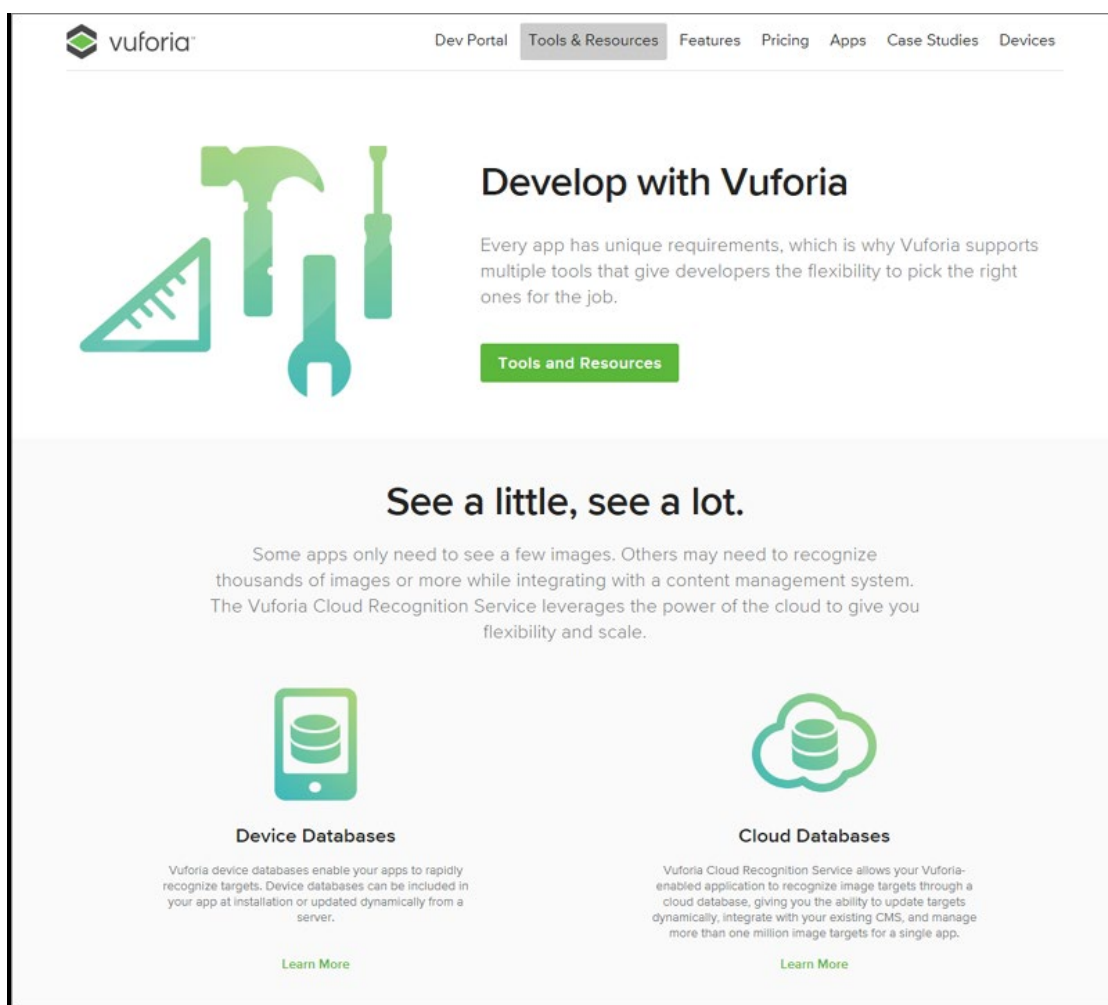
### Vuforia 擴增實境技術簡介

Vuforia 原本是高通公司提供的 AR 擴增實境開發平台，2015 年工業設計軟體公司 PTC 參數科技以 6,500 萬美元收購 Vuforia 平台。

Vuforia 提供 iOS / Android 行動裝置的 SDK 軟體開發套件與 Unity 遊戲引擎外掛程式，讓您輕鬆製作各種平台的擴增實境應用程式。

以往 AR 開發工具 ARToolKit、Unifeye 等軟體的授權價格非常昂貴，而 Vuforia 可以免費下載，使用高階功能與服務才需要另外付費。

官方網站 <http://www.vuforia.com>



vuforia

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## Develop with Vuforia

Every app has unique requirements, which is why Vuforia supports multiple tools that give developers the flexibility to pick the right ones for the job.

[Tools and Resources](#)

### See a little, see a lot.

Some apps only need to see a few images. Others may need to recognize thousands of images or more while integrating with a content management system. The Vuforia Cloud Recognition Service leverages the power of the cloud to give you flexibility and scale.

#### Device Databases

Vuforia device databases enable your apps to rapidly recognize targets. Device databases can be included in your app at installation or updated dynamically from a server.

[Learn More](#)

#### Cloud Databases

Vuforia Cloud Recognition Service allows your Vuforia-enabled application to recognize image targets through a cloud database, giving you the ability to update targets dynamically, integrate with your existing CMS, and manage more than one million image targets for a single app.

[Learn More](#)

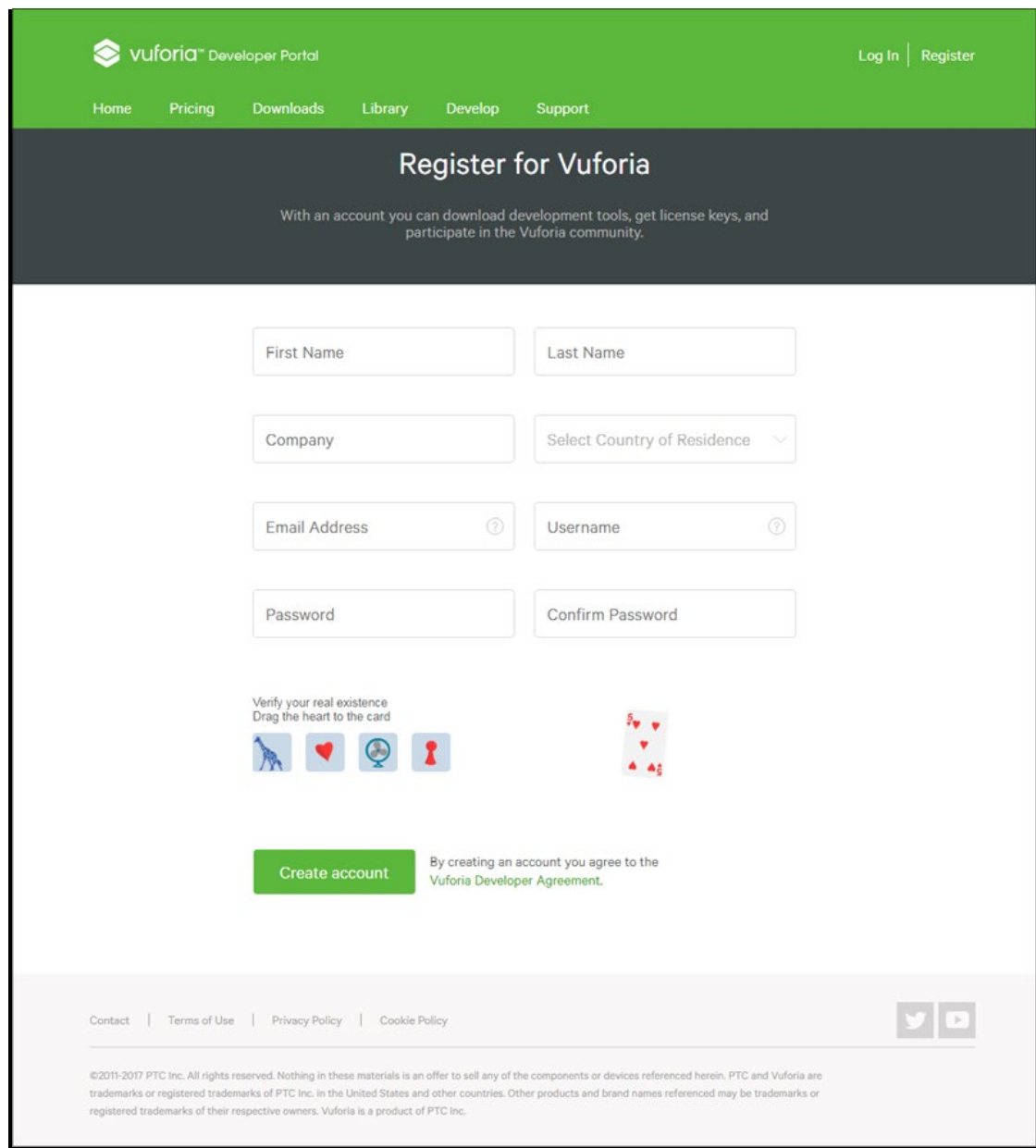
開發者入口網站 <https://developer.vuforia.com> 按下網頁右上方 Register 註冊

的連結。

您必須先在 **Vuforia** 網站申請帳號，才能使用線上服務、下載 **Vuforia SDK** 與擴增實境的範例檔案。

點選網頁右上方的「**Register**」按鈕，接著在申請帳號的頁面輸入姓名、電子信箱、登入密碼等資訊。

注意密碼至少需要 **8** 個字元，包含數字、大寫與小寫英文字母，完成後按下 **Create account** 按鈕。



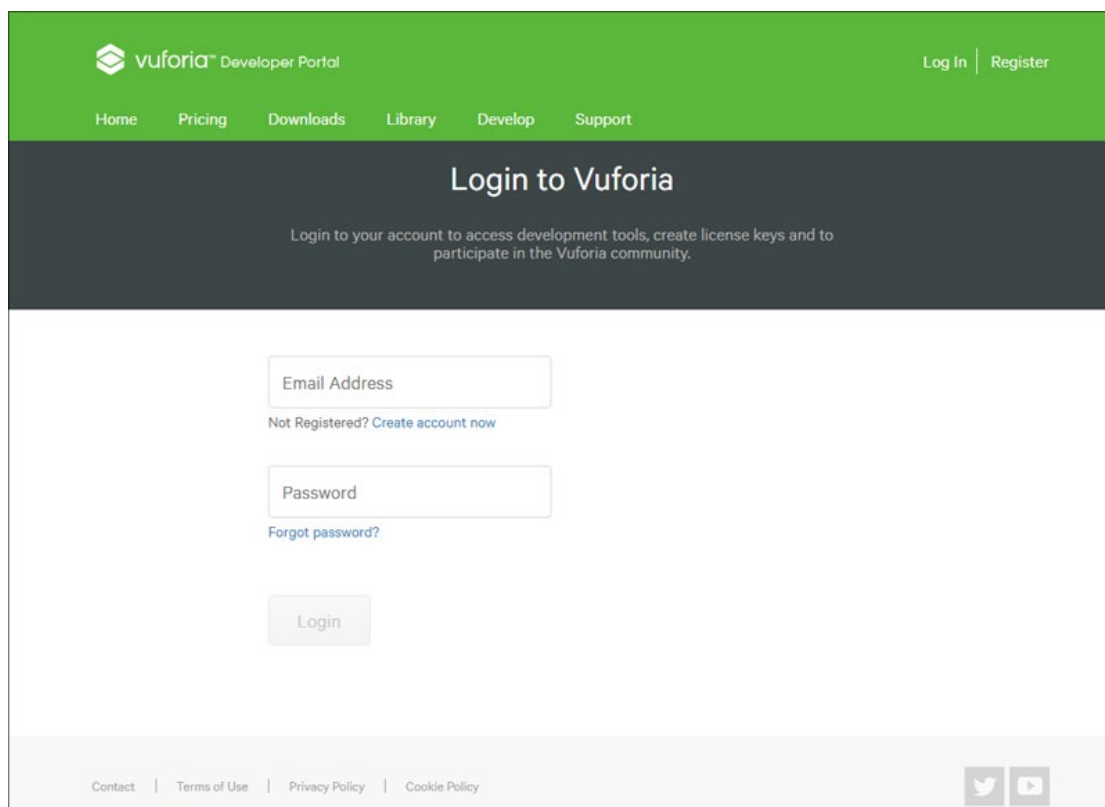
The image shows the registration page for the Vuforia Developer Portal. The page has a green header with the Vuforia logo and navigation links: Home, Pricing, Downloads, Library, Develop, and Support. The main heading is "Register for Vuforia". Below the heading, there is a sub-heading: "With an account you can download development tools, get license keys, and participate in the Vuforia community." The registration form consists of several input fields: First Name, Last Name, Company, Select Country of Residence (a dropdown menu), Email Address, Username, Password, and Confirm Password. Below the form, there is a CAPTCHA section titled "Verify your real existence" with the instruction "Drag the heart to the card". The CAPTCHA shows four icons: a giraffe, a heart, a globe, and a key, and a card with five red hearts. At the bottom of the form, there is a green "Create account" button and a checkbox for "By creating an account you agree to the Vuforia Developer Agreement." The footer contains links for Contact, Terms of Use, Privacy Policy, and Cookie Policy, along with social media icons for Twitter and YouTube. A copyright notice is also present at the bottom: "©2011-2017 PTC Inc. All rights reserved. Nothing in these materials is an offer to sell any of the components or devices referenced herein. PTC and Vuforia are trademarks or registered trademarks of PTC Inc. in the United States and other countries. Other products and brand names referenced may be trademarks or registered trademarks of their respective owners. Vuforia is a product of PTC Inc."

**Vuforia** 網站將會寄出認證信到您的信箱，請開啟認證信並點選連結以啟用申請

的帳號。

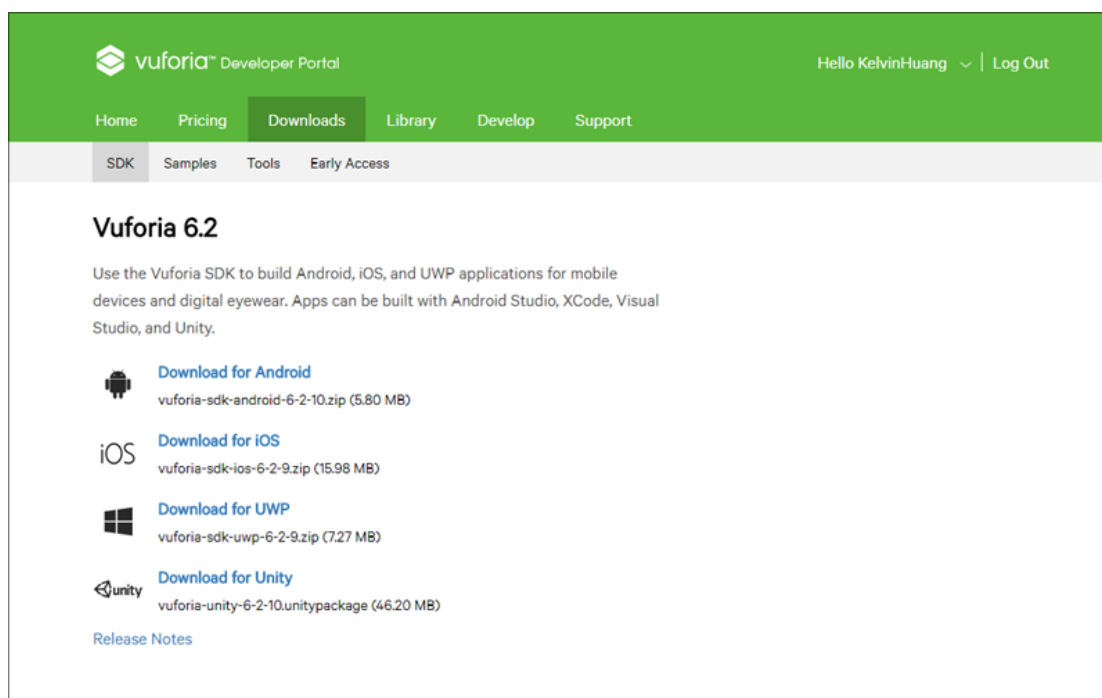


點選網頁右上方的 **Log In** 連結，然後輸入電子信箱與密碼，登入後網頁將會顯示您的帳號資訊。



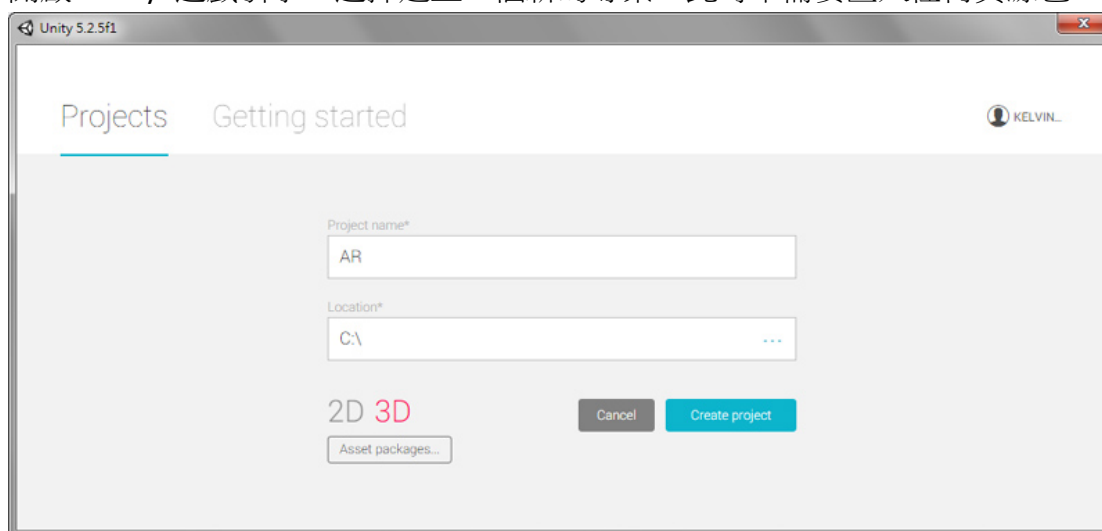
下載 **Unity** 外掛程式，按下 **Download for Unity** 連結，網頁將會顯示 **Software**

License 軟體授權，請按下 I Agree 我同意按鈕。

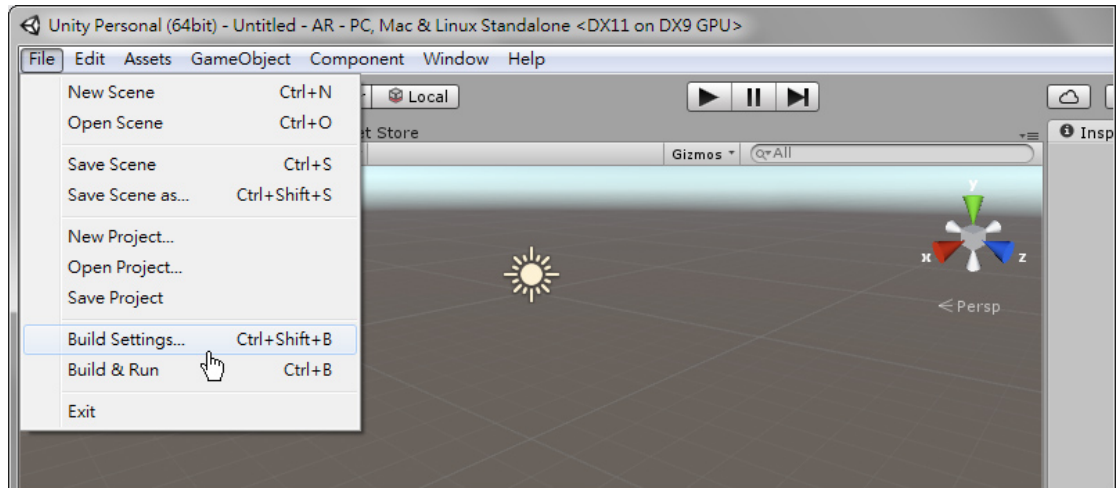


Vuforia 經常改版並且加入新的功能，除了擴增實境的基本功能，Vuforia 更提供了 Text Recognition 文字辨識、Cloud Recognition 雲端辨識、Milti-Targets 多重目標、Frame Markers 框架標記、Video Playback 影片播放，辨識圓柱形的圖片、使用虛擬按鈕進行互動等功能。

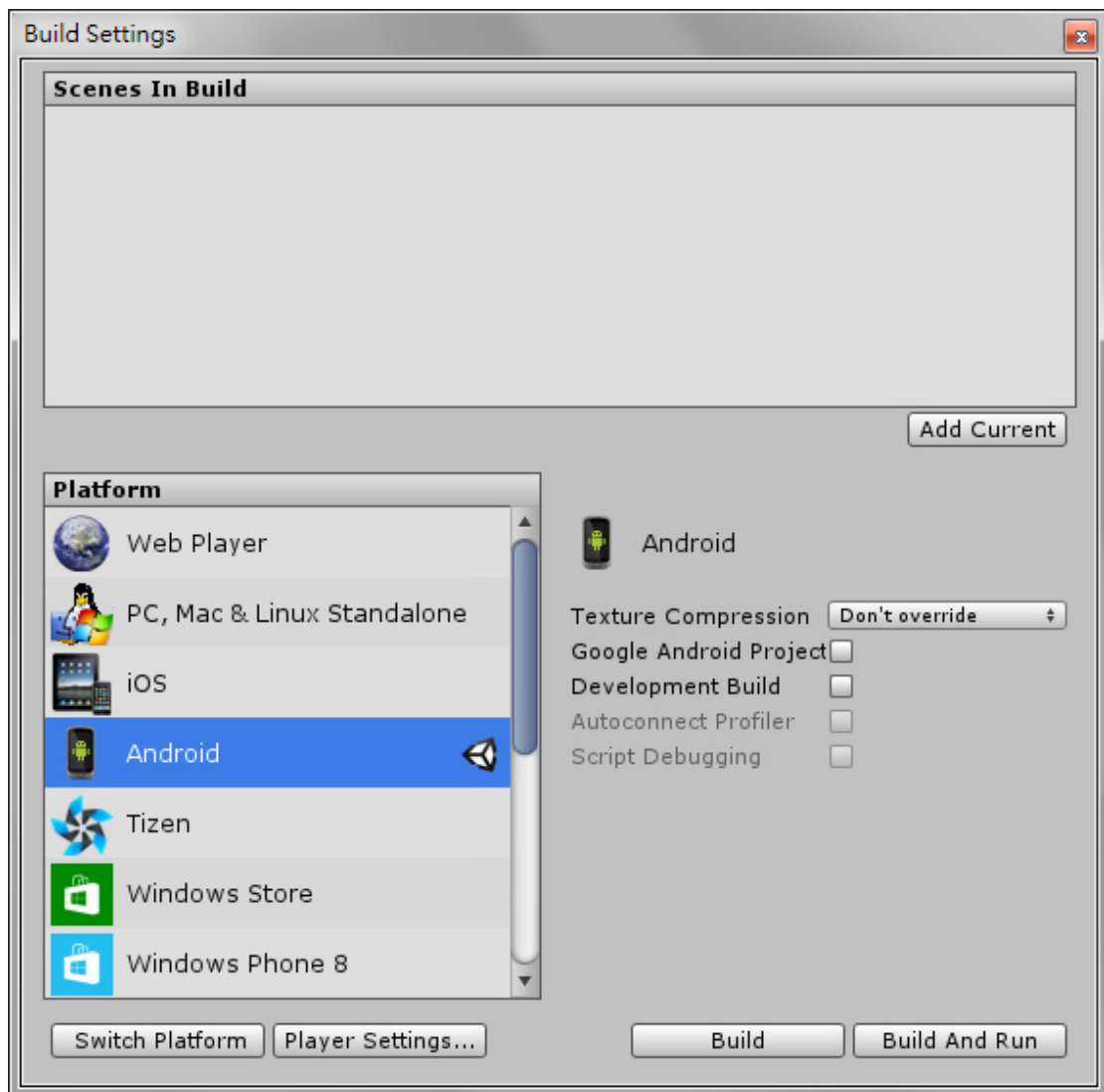
開啟 Unity 遊戲引擎，選擇建立一個新的專案，此時不需要匯入任何資源包。



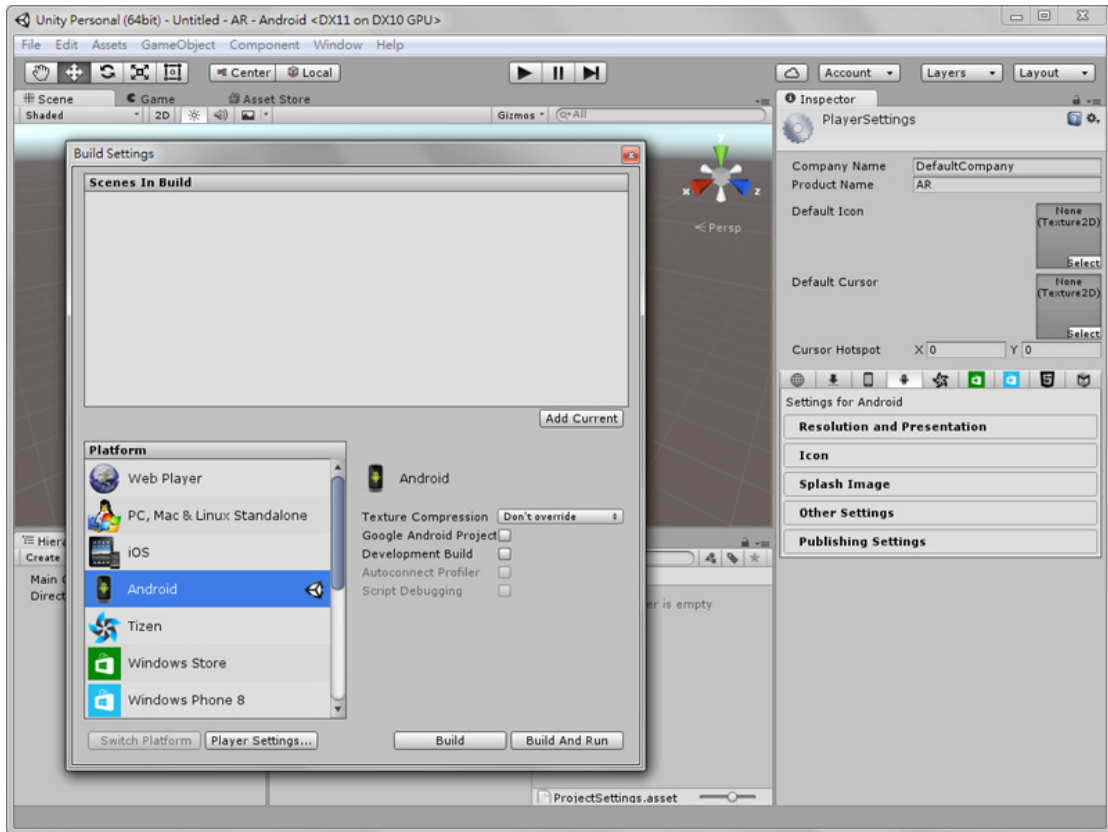
點選功能表 [ File > Build Settings ] 進行 App 發佈設定。



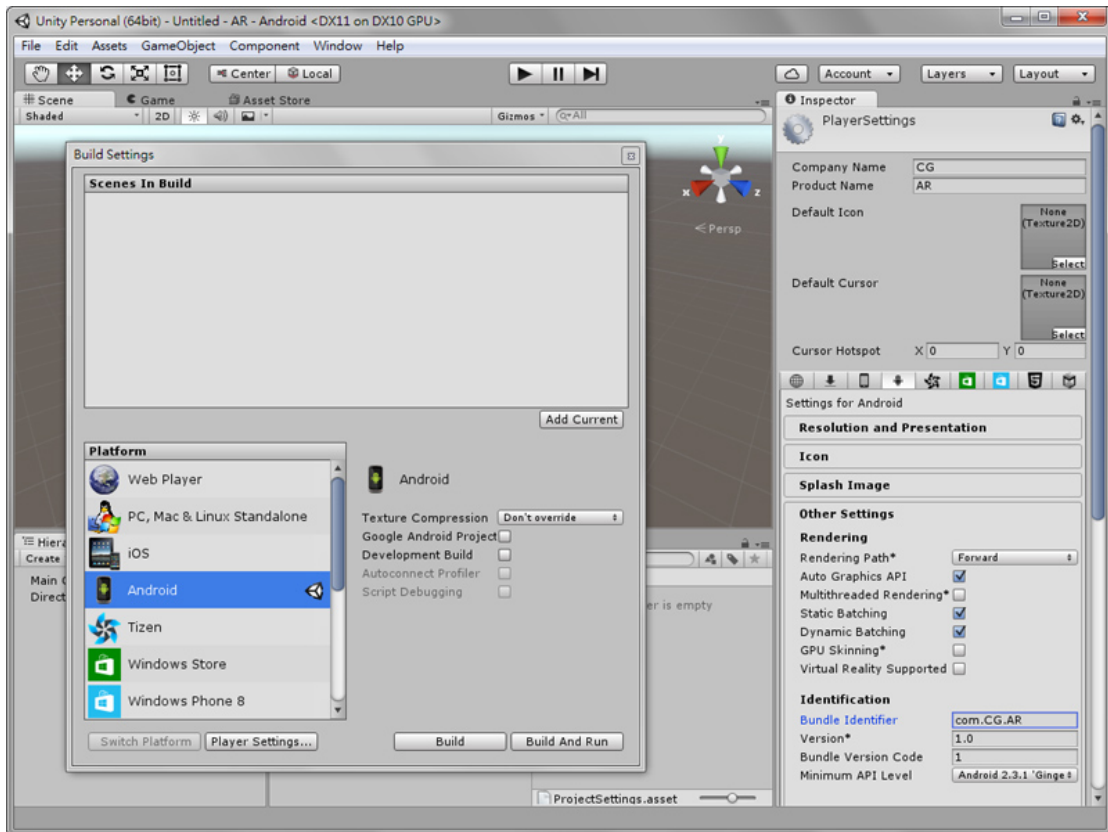
選擇 Android 後按下 Switch Platform 按鈕。



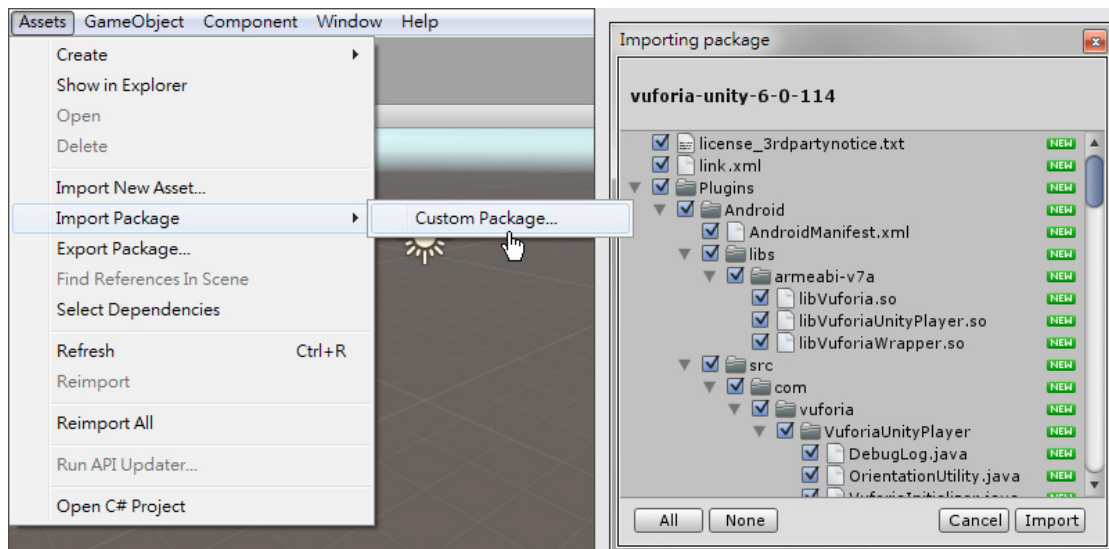
按下 Build Settings 對話話框下方的 Player Settings 按鈕。



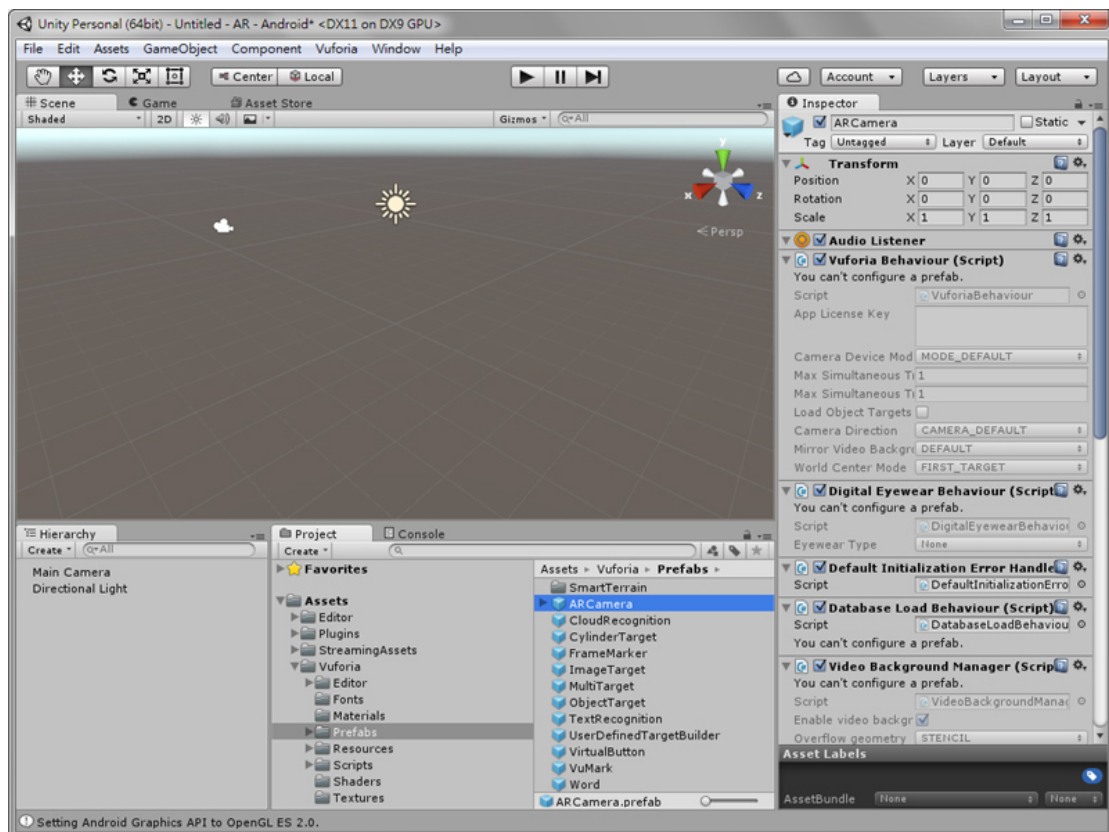
Player Settings 的 Bundle Identifier 必須設定。



執行 [ Assets > Import Package > Custom Package ] 匯入剛才從 Vuforia 網站下載的資源包。



為了讓 AR 功能可以正常運作，需要使用 Vuforia 提供的相機，開啟 [ Vuforia > Prefabs ] 資料夾，將 ARCamera 拖曳到遊戲場景。



Vuforia 安裝完成後，遊戲專案將會增加 Editor、Plugins、Qualcomm

Augmented Reality、Streaming Assets 資料夾，功能說明如下：



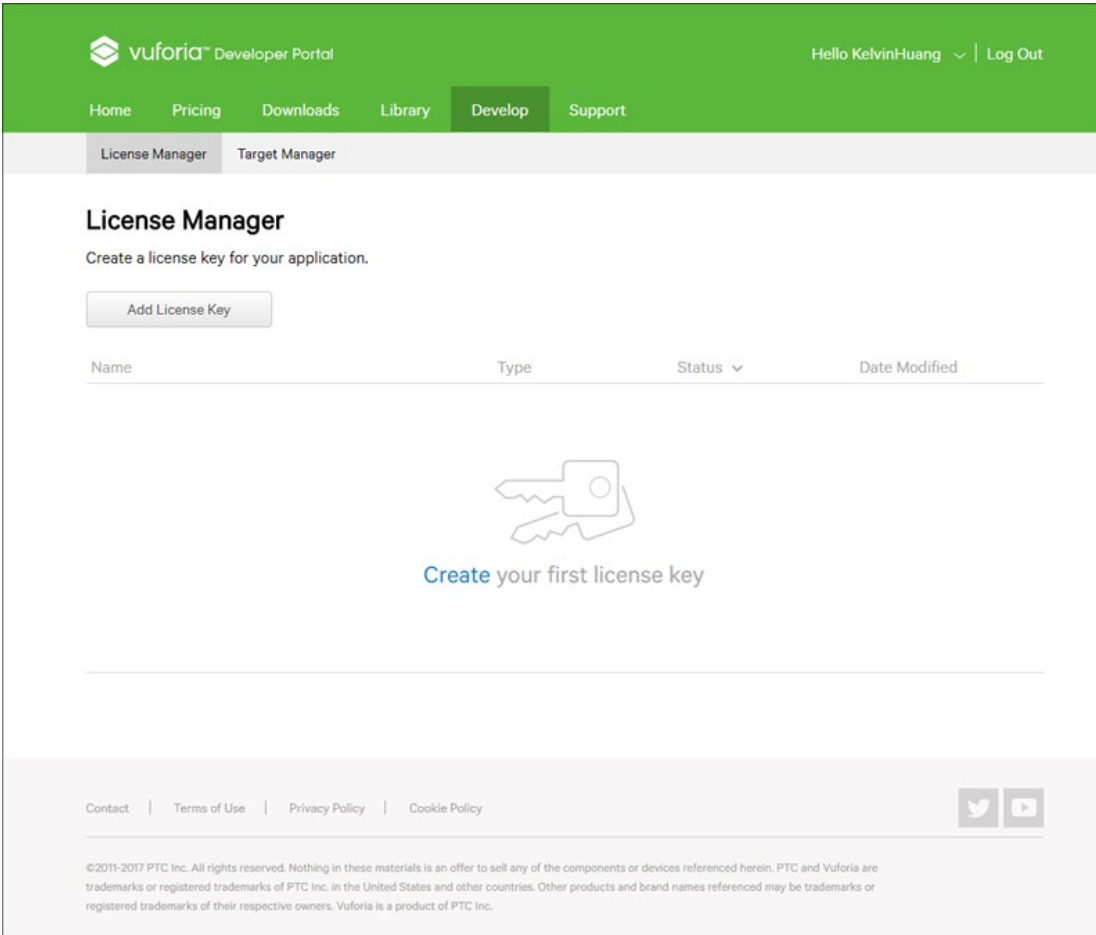
**Editor** - 此資料夾包含了在 Unity 編輯器中與目標資料進行互動所需的腳本程式。

**Plugins** - 包含 Java 與二進位檔案，用於整合 Vuforia AR SDK、Unity Android、Unity iOS 應用程式。

**Qualcomm Augmented Reality** - 此資料夾包含製作 AR 擴增實境所需要的預製物件與腳本。

**Streaming Assets** - 包含 Device Database 設備資料庫的 XML 與 DAT 組態設定檔（稍後將會從 Vuforia 網站的 Target Manager 下載到這個資料夾）。

接著，我們還需要新增 Device Database（設備資料庫）到目前的遊戲專案，License Manager 授權管理員。



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License Manager Target Manager

### License Manager

Create a license key for your application.

Add License Key

Name	Type	Status	Date Modified
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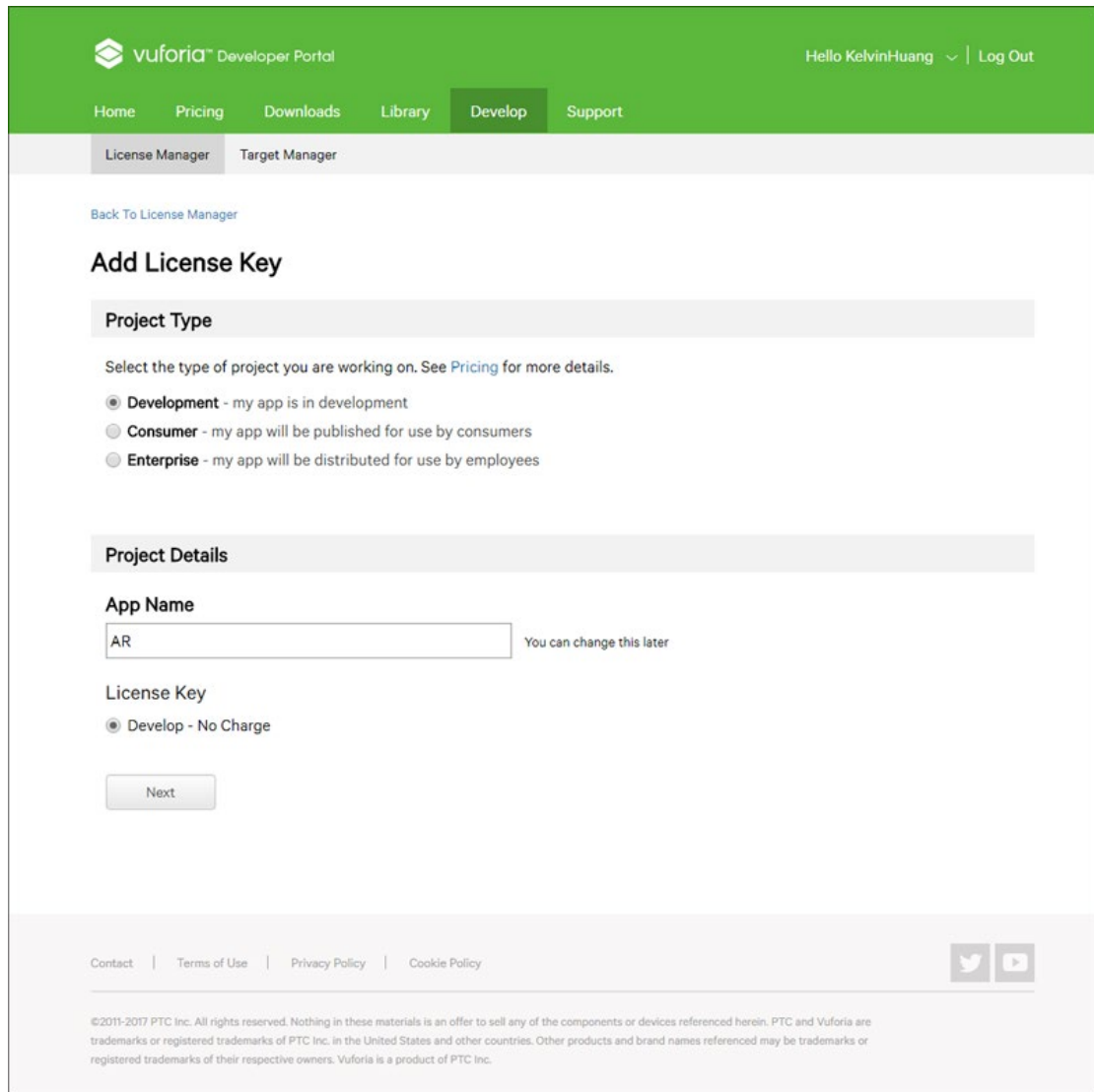
Create your first license key

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Add License Key 新增授權，選擇 Development 開發授權，免費但畫面上會出現 Vuforia 浮水印。



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License Manager Target Manager

[Back To License Manager](#)

## Add License Key

### Project Type

Select the type of project you are working on. See [Pricing](#) for more details.

- Development** - my app is in development
- Consumer** - my app will be published for use by consumers
- Enterprise** - my app will be distributed for use by employees

### Project Details

**App Name**

AR You can change this later

**License Key**

- Develop - No Charge**

Next

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按下 Next 按鈕。

The screenshot shows the Vuforia Developer Portal interface. At the top, there is a green header with the Vuforia logo and 'Developer Portal' text on the left, and 'Hello KelvinHuang' with a dropdown arrow and 'Log Out' on the right. Below the header is a navigation bar with links for 'Home', 'Pricing', 'Downloads', 'Library', 'Develop', and 'Support'. The 'Develop' link is highlighted. Underneath, there are two tabs: 'License Manager' (selected) and 'Target Manager'. The main content area has a link 'Back To License Manager' and a heading 'Confirm License Key'. It displays the following details: 'Project Type: Development', 'App Name: AR', and 'License Key: Develop'. Below these, it lists usage limits: 'Price: No Charge', 'Reco Usage: 1000 per month', 'Cloud Targets: 1000', 'VuMark Templates: 1 active', and 'VuMarks: 100'. A checkbox is checked, with the text: 'By clicking "Confirm" below, you acknowledge that this license key is subject to the terms and conditions of the Vuforia Developer Agreement.' At the bottom of the form are two buttons: 'Cancel' and 'Confirm'. The footer contains links for 'Contact', 'Terms of Use', 'Privacy Policy', and 'Cookie Policy', along with social media icons for Twitter and YouTube. A copyright notice at the very bottom reads: '©2011-2017 PTC Inc. All rights reserved. Nothing in these materials is an offer to sell any of the components or devices referenced herein. PTC and Vuforia are trademarks or registered trademarks of PTC Inc. in the United States and other countries. Other products and brand names referenced may be trademarks or registered trademarks of their respective owners. Vuforia is a product of PTC Inc.'

使用 Vuforia 開發者網站的 Target Manager ，透過上傳圖片來建立擴增實境的 Target ，也就是所謂的「AR 圖卡」。

進入網頁上方的 Target Manager 標籤，按下網頁右邊的 Add Database 按鈕建立資料庫。

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License Manager **Target Manager**

## Target Manager

Use the Target Manager to create and manage databases and targets.

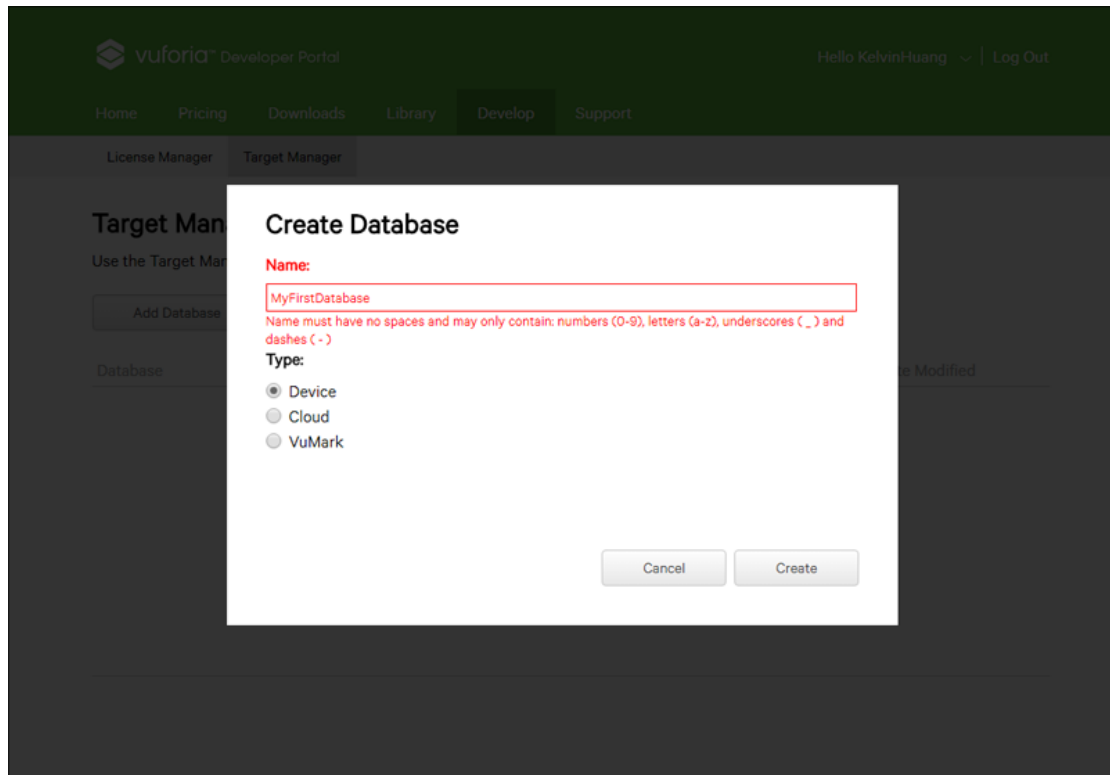
[Add Database](#)

Database	Type	Targets	Date Modified
 <b>Create your first Database</b>			

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輸入資料庫的名稱，注意不可包含空白與特殊符號，例如輸入 **MyFirstDatabase** 然後按下 **Create** 建立按鈕。



資料庫建立完成！目前當然是空的，因為還沒有上傳任何圖片，請按下資料庫名稱 **MyFirstDatabase** 進入資料庫。

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License Manager **Target Manager**



## Target Manager

Use the Target Manager to create and manage databases and targets.

[Add Database](#)

Database	Type	Targets	Date Modified
MyFirstDatabase	Device	0	Aug 21, 2017 20:00

Last updated: Today 8:00 PM [Refresh](#)

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按下 **Add Target** 新增目標按鈕。

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License Manager **Target Manager**

Target Manager > MyFirstDatabase

## MyFirstDatabase [Edit Name](#)

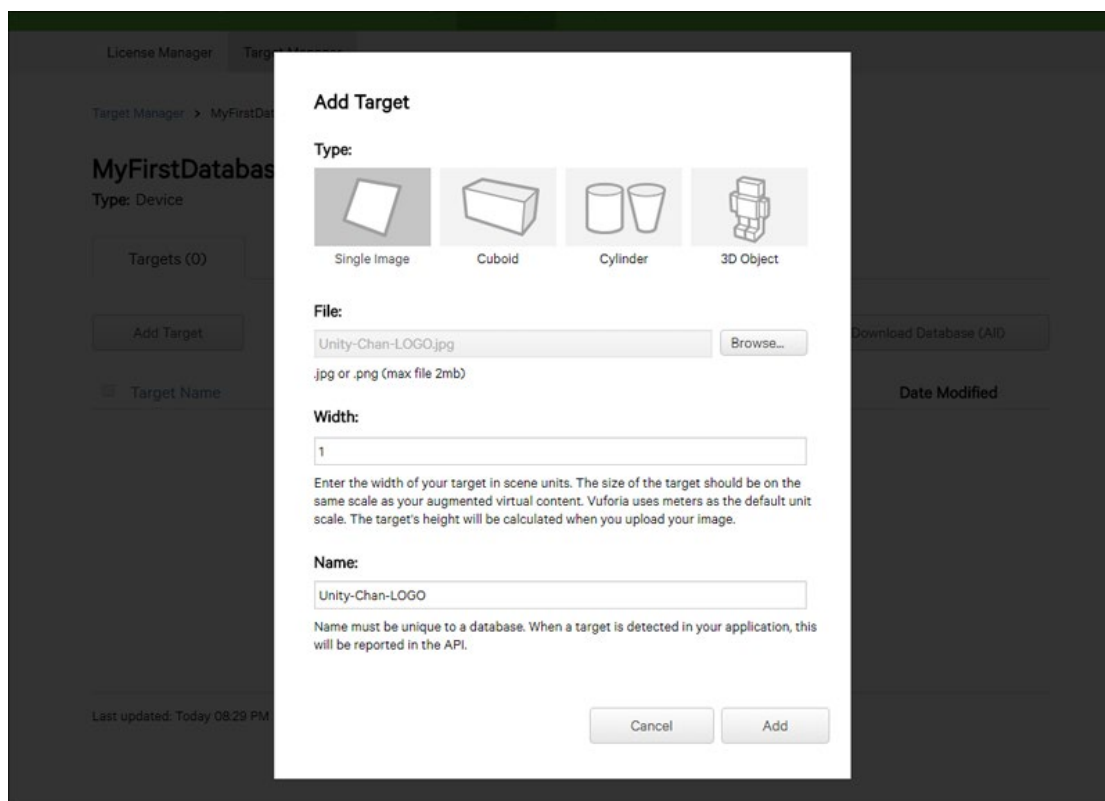
Type: Device

Targets (0)

[Add Target](#) [Download Database \(AID\)](#)

Target Name	Type	Rating	Status	Date Modified
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上傳的檔案僅支援 jpg 與 png 格式，檔案名稱只能包含英文、數字與底線 ( \_ )，不能使用空白、中文與特殊符號。



**Add Target**

Type:

Single Image   Cuboid   Cylinder   3D Object

File:

Unity-Chan-LOGO.jpg   Browse...

.jpg or .png (max file 2mb)

Width:

1

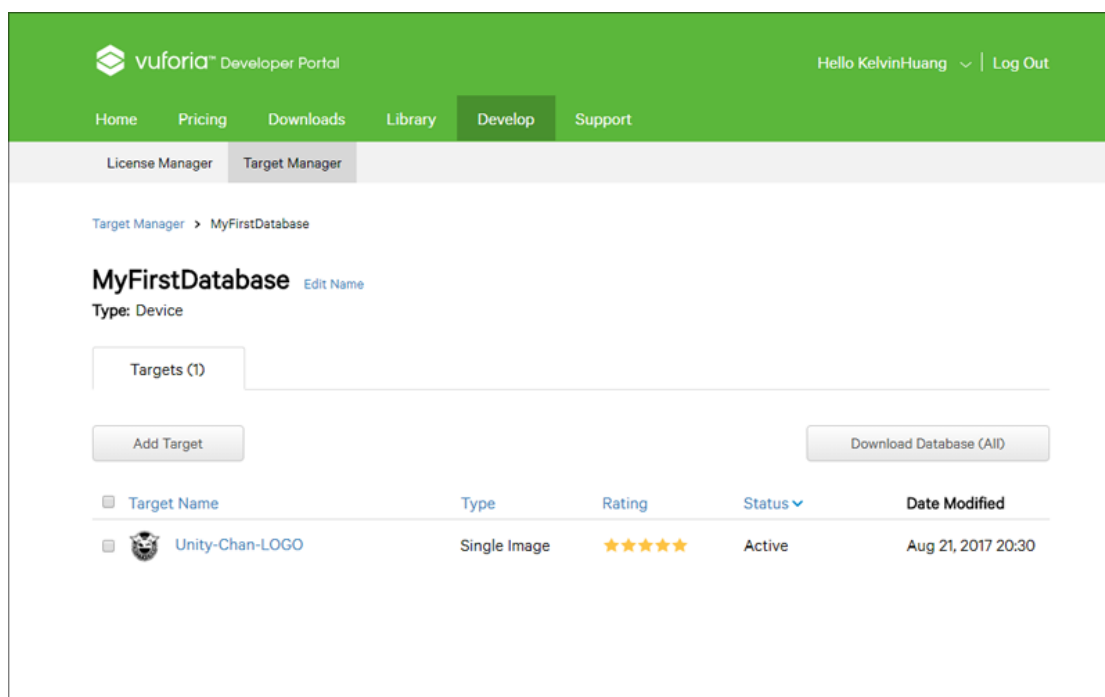
Enter the width of your target in scene units. The size of the target should be on the same scale as your augmented virtual content. Vuforia uses meters as the default unit scale. The target's height will be calculated when you upload your image.

Name:

Unity-Chan-LOGO

Name must be unique to a database. When a target is detected in your application, this will be reported in the API.

Cancel   Add



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License Manager   Target Manager


Target Manager > MyFirstDatabase

**MyFirstDatabase**   Edit Name

Type: Device

Targets (1)

Add Target   Download Database (AID)

Target Name	Type	Rating	Status	Date Modified
<input type="checkbox"/>  Unity-Chan-LOGO	Single Image	★★★★★	Active	Aug 21, 2017 20:30

點選功能表 [ Asset > Import Package > Custom Package ] 選取下載的資料庫檔案。

按下 Import 按鈕匯入 Target Device Database 目標設備資料庫。

AR 應用程式需要使用行動裝置上的攝影機，用不到 Unity 預設的攝影機，請將場景中的 Main Camera 攝影機刪除，開啟 Prefabs 資料夾，將 ARCamera 預製物件拖曳到 Hierarchy 階層視窗。

使用滑鼠將 Project 專案視窗 Prefabs 資料夾中的 ImageTarget 預製物件拖曳到 Hierarchy 階層視窗。

選取 ImageTarget 物件，從 Inspector 屬性編輯器的 Image Target Behaviour 元件，Type（類型）下拉選單選擇 Predefined（預先定義），Data Set 選擇剛才在 Device Database 建立的資料集，最後從 Image Target 選擇 Target（圖片）。將 3D 模型拖曳到場景並調整位置與大小，從 Hierarchy 視窗將 3D 物件拖曳到 ImageTarget 上，使其成為 ImageTarget 的子物件，最後將遊戲發佈 APK 安裝檔，使用實機進行測試。