

GCP AI 應用

Enos Chou

2022/02/21, 02/22

Enos' Steps

2021/12/30(四) 09:00~16:30	專題主題講座 by Enos
2022/01/13(四) 09:00~16:30	專題輔導 by Teams feat. Enos
2022/02/15(二) 09:00~16:30	AIoT by Enos
2022/02/21(一) 09:00~16:30	GCP AI 應用 by Enos
2022/02/22(二) 09:00~16:30	GCP AI 應用 by Enos
2022/02/24(四) 09:00~16:30	專題輔導 by Teams feat. Enos
2022/03/01(二) 09:00~16:30	產業趨勢職涯講座 by Enos
2022/03/10(四) 09:00~16:30	專題輔導 by Teams feat. Enos

Before GCP AI

Preparation

1. New GCP Free Trial Account

- 以三個月內新開通的試用帳號完成登入 <https://console.cloud.google.com>
- 申請時須信用卡，預刷 40 元不會請款

2. Laptop/ Desktop feat. Windows 10 or macOS 11+

- 建立開發環境包含
 - Python 3.6.X、TensorFlow 2.4.3、Jupyter Notebook latest

Why Cloud AI ?

Why Cloud AI ?

by Whom ?

1. Efficiency → 不用寫也不用管
2. Performance → 又準又快
3. Cost Saving → 省錢
4. Scability → 彈性

Which Cloud AI ?

Magic Quadrant for Cloud

1. Magic Quadrant for Cloud Infrastructure and Platform Services
(2021/07)

2. Magic Quadrant for Cloud AI Developer Services
(2021/02)

Agenda

Adopt Ready-Made AI through **GCP AI API**

- Initialization

- Speech-to-Text API

- Vision API

- Call by GCE

Spend Least Effort from Training to Serving AI by **Vertex AI**

- No-Code AI, Imported AI Serving

- Low-Code AI, Training to Serving by AutoML

Initialization

Initialization

1. 帳號登入
2. 建立新專案
3. 切換至新專案

Initialization

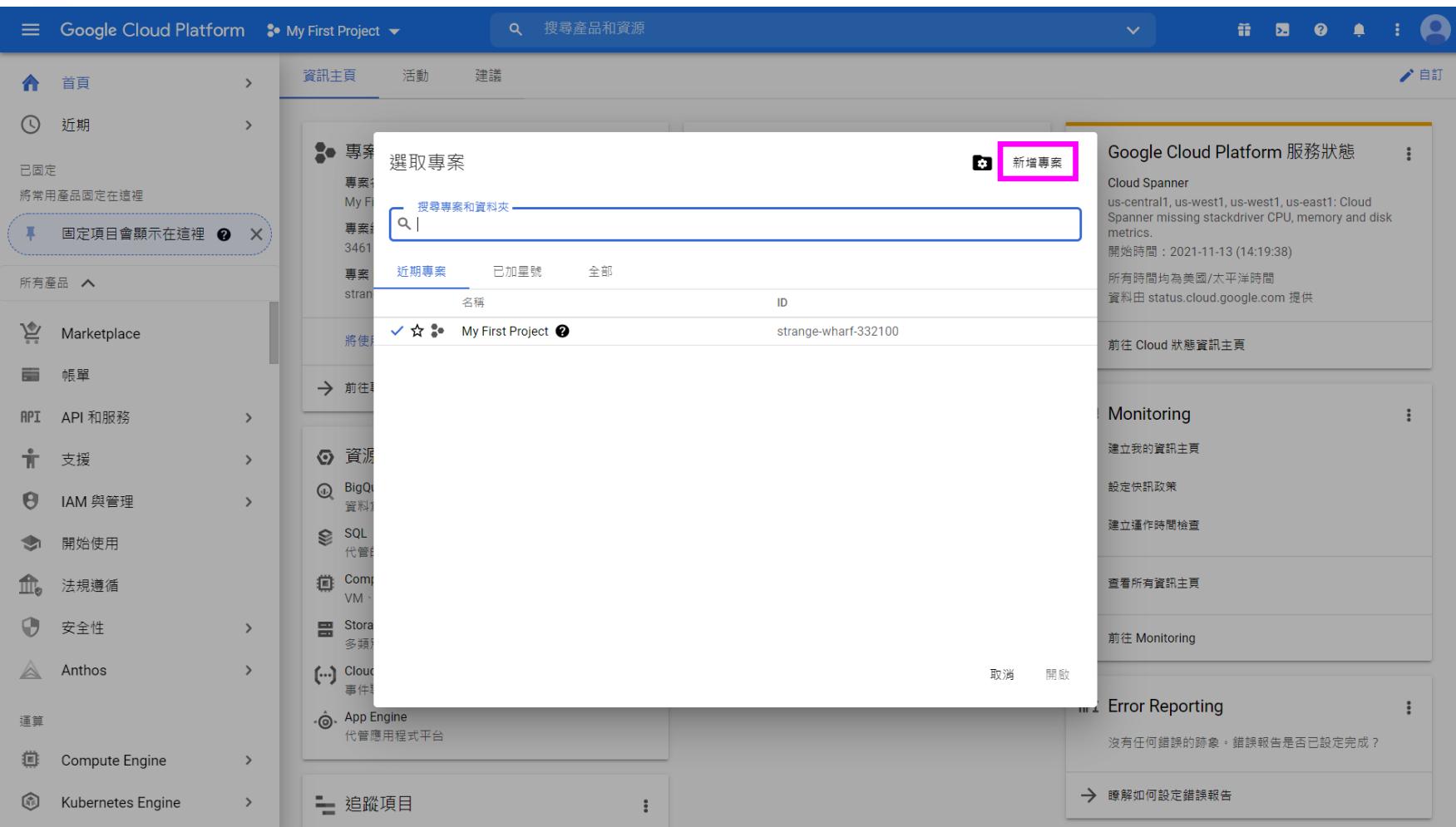
1. 帳號登入

<https://console.cloud.google.com/>

The screenshot shows the Google Cloud Platform homepage for the project "My First Project". The top navigation bar includes the project name, search bar, and user profile. The left sidebar lists various services: Marketplace, 帳單 (Billing), API 和服務 (API & Services), 支援 (Support), IAM 與管理 (IAM & Management), 開始使用 (Getting Started), 法規遵循 (Regulatory Compliance), 安全性 (Security), Anthos, 運算 (Compute), Compute Engine, and Kubernetes Engine. The main content area displays project details (專案名稱: My First Project, 專案編號: 346115793763, 專案 ID: strange-wharf-332100), an API section with a chart showing requests per second over time, and sections for Google Cloud Platform 服務狀態, Monitoring, and API Error Reporting.

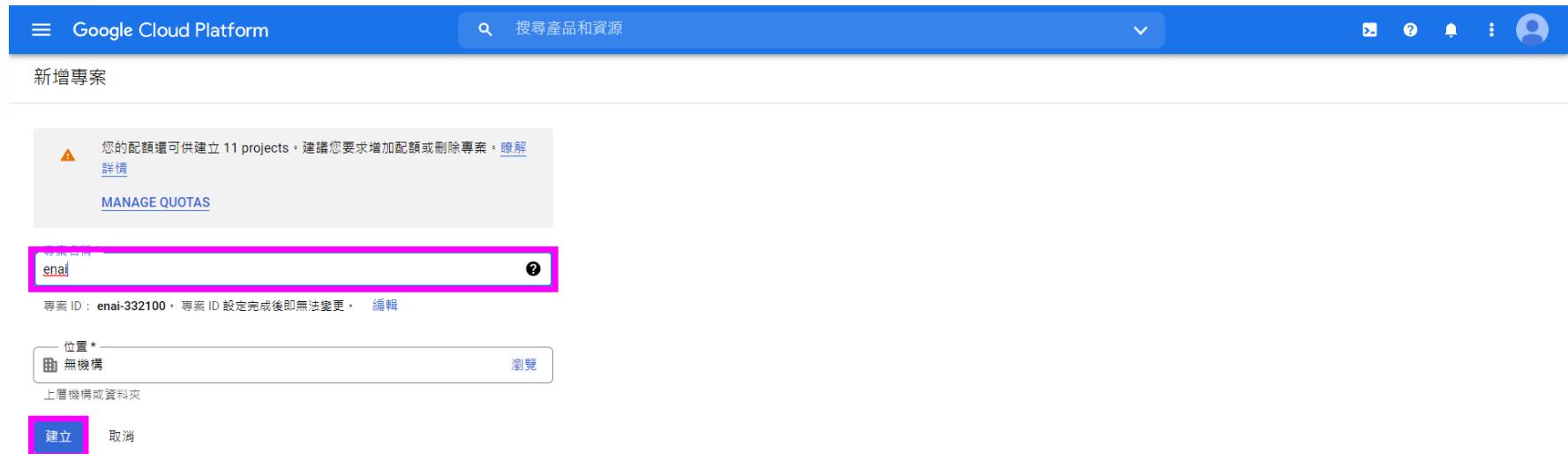
Initialization

2. 建立新專案



Initialization

2. 建立新專案



Initialization

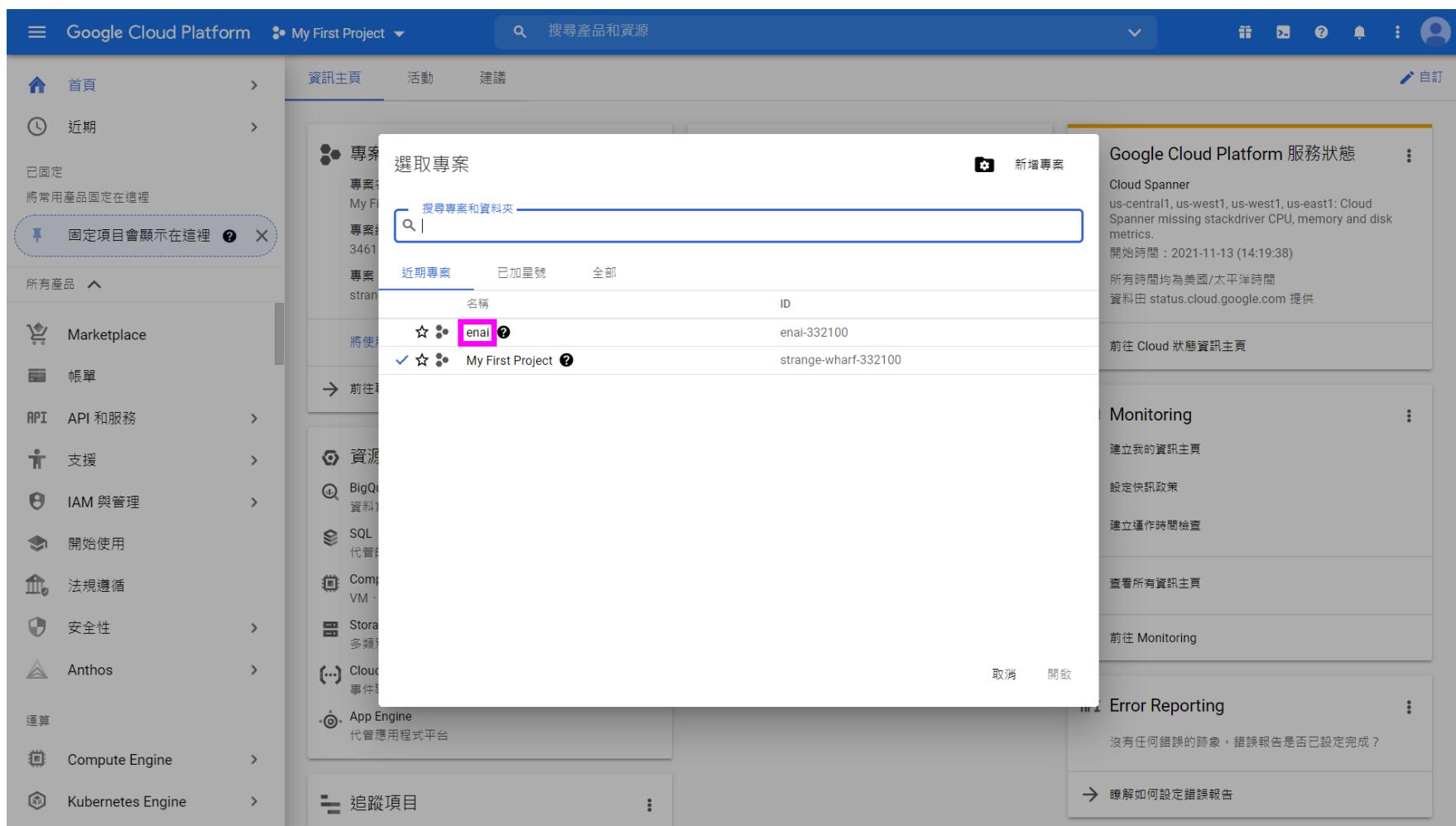
2. 建立新專案

The screenshot shows the Google Cloud Platform Home page for the project "My First Project". The top navigation bar includes the project name, a search bar, and various icons. The main content area is divided into several sections:

- 專案資訊**: Displays the project name (My First Project), project ID (346115793763), and project ID (strange-wharf-332100). It also includes a link to "前往專案設定".
- API API**: Shows API usage statistics with a chart indicating "No data is available for the selected time frame." The chart has four data series: 0.4, 0.2, 0, and 0. Below the chart are links to "前往 API 總覽" and "前往 Cloud 狀態資訊主頁".
- 資源**: Lists available resources including BigQuery, SQL, Compute Engine, Storage, Cloud Functions, and App Engine.
- 追蹤項目**: A section for tracking projects.
- 通知**: A sidebar on the right lists recent notifications: "建立專案 : enai" and "建立專案 : My First Project".
- Monitoring**: A section for monitoring resources.
- API Error Reporting**: A section for managing API error reporting.

Initialization

3. 切換至新專案



Initialization

3. 切換至新專案

The screenshot shows the Google Cloud Platform Home page. On the left, there's a sidebar with navigation links like '首頁', '近期', '所有產品', 'Marketplace', '帳單', 'API 和服務', '支援', 'IAM 與管理', '開始使用', '法規遵循', '安全性', 'Anthos', '運算', 'Compute Engine', and 'Kubernetes Engine'. The main content area has several sections: '專案資訊' (Project Information) showing details like '專案名稱: enai', '專案編號: 628452886037', and '專案 ID: enai-332100'; 'API API' (API) showing a chart for '要求 (每秒要求數)' (Requests (per second)) over time; 'Google Cloud Platform 服務狀態' (Google Cloud Platform Service Status) showing a warning for Cloud Spanner; 'Monitoring' (Monitoring) with links to '建立我的資訊主頁' (Create my dashboard), '設定快訊政策' (Set up alerting policies), and '建立運作時間檢查' (Create uptime checks); and 'API Error Reporting' (API Error Reporting) with a message about no errors reported. A search bar at the top right says '搜尋產品和資源'.

Speech-to-Text API

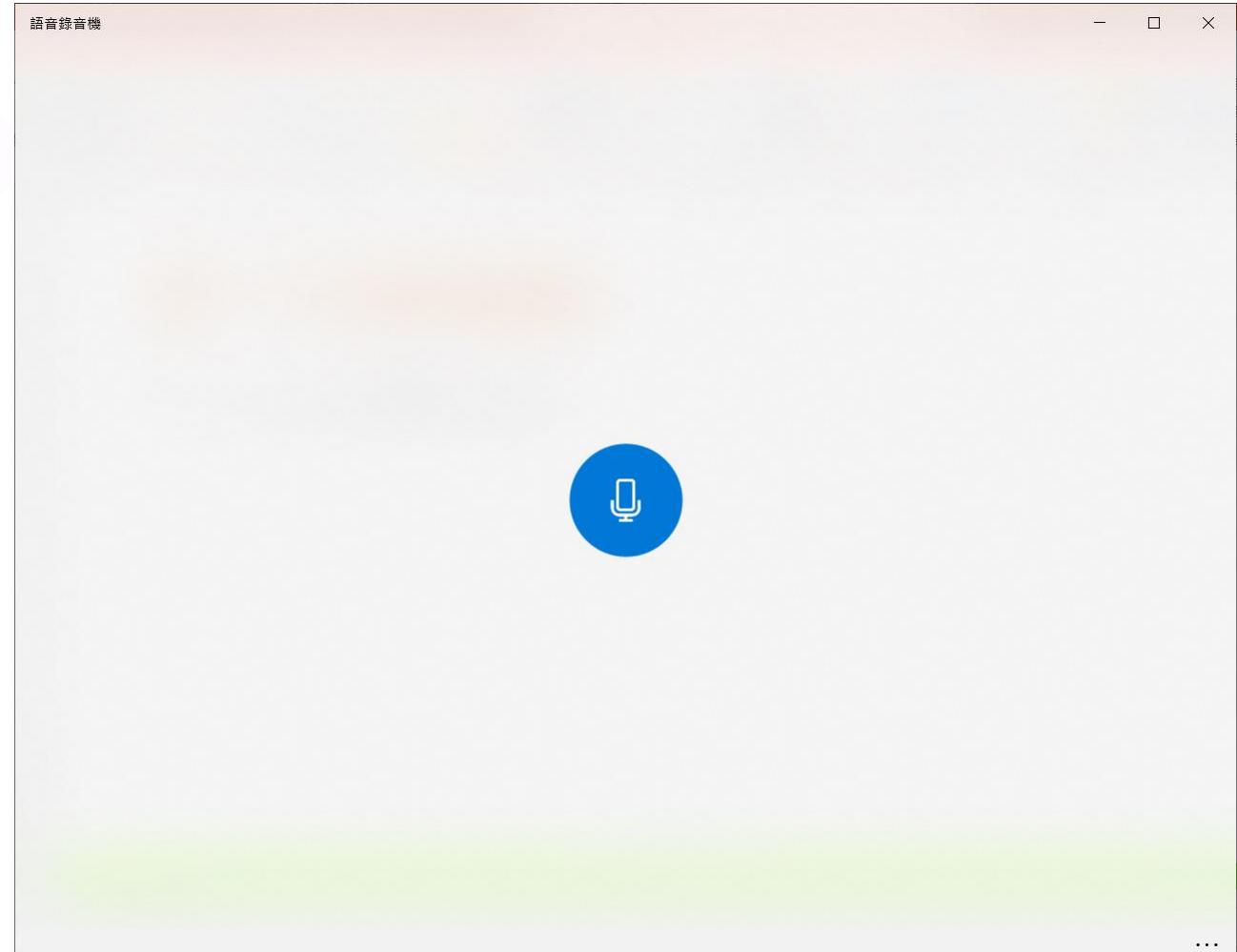
Cloud Speech-to-Text API
Service Account
Speech-to-Text Application

Cloud Speech-to-Text API

製作樣本

- Windows 10 語言錄音機
Windows 鍵 →
14筆 語音錄音機
- macOS 語音備忘錄 or
錄音機

自行錄製中文語音並儲存



Cloud Speech-to-Text API

先試試

<https://cloud.google.com/speech-to-text>

The screenshot shows the Google Cloud Speech-to-Text API landing page. At the top, there's a navigation bar with the Google Cloud logo, search bar, and links for '文件' (File), '支援' (Support), '中文 - 繁體' (Chinese - Traditional), and '控制台' (Console). Below the navigation is a banner for 'Cloud 語音轉文字' (Cloud Speech-to-Text). The main content area has a sidebar on the left with sections like 'Speech-to-Text', '優點' (Advantages), '示範' (Demo) (which is highlighted with a pink box), '主要功能與特色' (Main features and characteristics), '客戶經驗談' (Customer testimonies), '最新資訊' (Latest news), '說明文件' (Documentation), '用途' (Use cases), '提升客戶服務品質' (Improve customer service quality), '提供語音控制機制' (Provide voice control mechanism), and '轉錄多媒體內容' (Transcribe multi-media content). The main content area features a large heading 'Speech-to-Text' and a sub-section '透過採用 Google AI 技術的 API 將語音準確轉換為文字。' (Through the API, accurately convert speech to text using Google AI technology). It includes two buttons: '前往主控台' (Go to the console) and '聯絡銷售人員' (Contact sales). A list of benefits follows: '✓ 將內容準確轉錄為字幕' (Accurately transcribe content to subtitles), '✓ 透過語音指令提供更優質的產品使用體驗' (Provide a better product usage experience through voice commands), and '✓ 從客戶互動資料取得深入分析結果，以便提升服務品質' (Obtain deep analysis results from customer interaction data to improve service quality). To the right, there's a 'Gartner' badge with text about Google Cloud being a leader in the Magic Quadrant for Cloud AI Developer Services. At the bottom, there are three columns: '絕佳準確率' (High accuracy), '輕鬆自訂模型' (Easy-to-customize models), and '彈性部署' (Flexible deployment), each with a brief description.

Cloud Speech-to-Text API

先試試

The screenshot shows the Google Cloud Speech-to-Text API demo page. At the top, there's a navigation bar with links for Google Cloud, 選用 Google 的理由, 解決方案, 產品, 定價, 開始使用, a search bar, and language options (Chinese - Traditional). Below the navigation is a sub-navigation bar with links for Cloud 語音轉文字, 示範, 實際運用 Speech-to-Text, and 聯絡我們.

示範

Speech-to-Text

示範

優點

主要功能與特色

客戶經驗談：使用 Speech-to-Text 打造音訊與語音解決方案

最新資訊

說明文件

用途

提升客戶服務品質

提供語音控制機制

轉錄多媒體內容

所有功能與特色

定價

後續步驟

實際運用 Speech-to-Text

如同以下示範，您可以使用 Speech-to-Text API，輕鬆將語音轉錄技術融入應用程式中。

Input type: Microphone File upload

Language: 國語 (台灣)

Speaker diarization: **BETA** Off

Speakers: 1 speaker

Punctuation:

Show JSON

CHOOSE FILE

主要功能與特色

語音調整

你可以輸入提示，藉由訂正語音錯誤，以訓練模型更準確的字詞和合併詞彙。

Cloud Speech-to-Text API

先試試

The screenshot shows the Google Cloud Speech-to-Text API demo page. At the top, there's a navigation bar with links for 'Google Cloud', '選用 Google 的理由', '解決方案', '產品', '定價', and '開始使用'. To the right are search, file, support, language (Chinese - Traditional), and control panel buttons. Below the navigation is a sub-navigation bar with 'Cloud 語音轉文字'.

The main content area has a sidebar on the left with sections like 'Speech-to-Text' (selected), '優點', '示範' (selected), '主要功能與特色', '客戶經驗談：使用 Speech-to-Text 打造音訊與語音解決方案', '最新資訊', '說明文件', '用途' (selected), '提升客戶服務品質', '提供語音控制機制', '轉錄多媒體內容', '所有功能與特色', '定價', and '後續步驟'.

The main right section is titled '實際運用 Speech-to-Text' and contains a description: '如同以下示範，您可以使用 Speech-to-Text API，輕鬆將語音轉錄技術融入應用程式中。' It includes configuration options for 'Input type' (radio buttons for 'Microphone' and 'File upload' with 'File upload' selected), 'Language' (dropdown set to '國語 (台灣)'), 'Speaker diarization' (dropdown set to 'Off'), 'Speakers' (dropdown set to '1 speaker'), and 'Punctuation' (checkbox). A 'CHOOSE FILE' button is available for file uploads. A progress bar at the bottom indicates 'Uploading file.' A CAPTCHA checkbox labeled '我不是機器人' is also present.

Cloud Speech-to-Text API

先試試

The screenshot shows the Google Cloud Speech-to-Text API demonstration interface. On the left, there's a sidebar with links like 'Speech-to-Text' (selected), '優點', '示範' (selected), '主要功能與特色', '客戶經驗談：使用 Speech-to-Text 打造音訊與語音解決方案', '最新資訊', '說明文件', '用途' (selected), '提升客戶服務品質', '提供語音控制機制', '轉錄多媒體內容', '所有功能與特色', '定價', and '後續步驟'. The main area has tabs for '示範' and '實際運用 Speech-to-Text'. Under '實際運用 Speech-to-Text', it says '如同以下示範，您可以使用 Speech-to-Text API，輕鬆將語音轉錄技術融入應用程式中。' It includes input fields for 'Input type' (set to 'File upload'), 'Language' (set to '國語 (台灣)'), 'Speaker diarization' (set to 'Off'), 'Speakers' (set to '1 speaker'), 'Punctuation' (set to 'On'), and a 'CHOOSE FILE' button. Below these is a preview window showing a dashed pink box around the text '今天天氣很好。' with a legend at the top indicating models: Default (selected), Command / Search, Phone call, and Video.

Cloud Speech-to-Text API

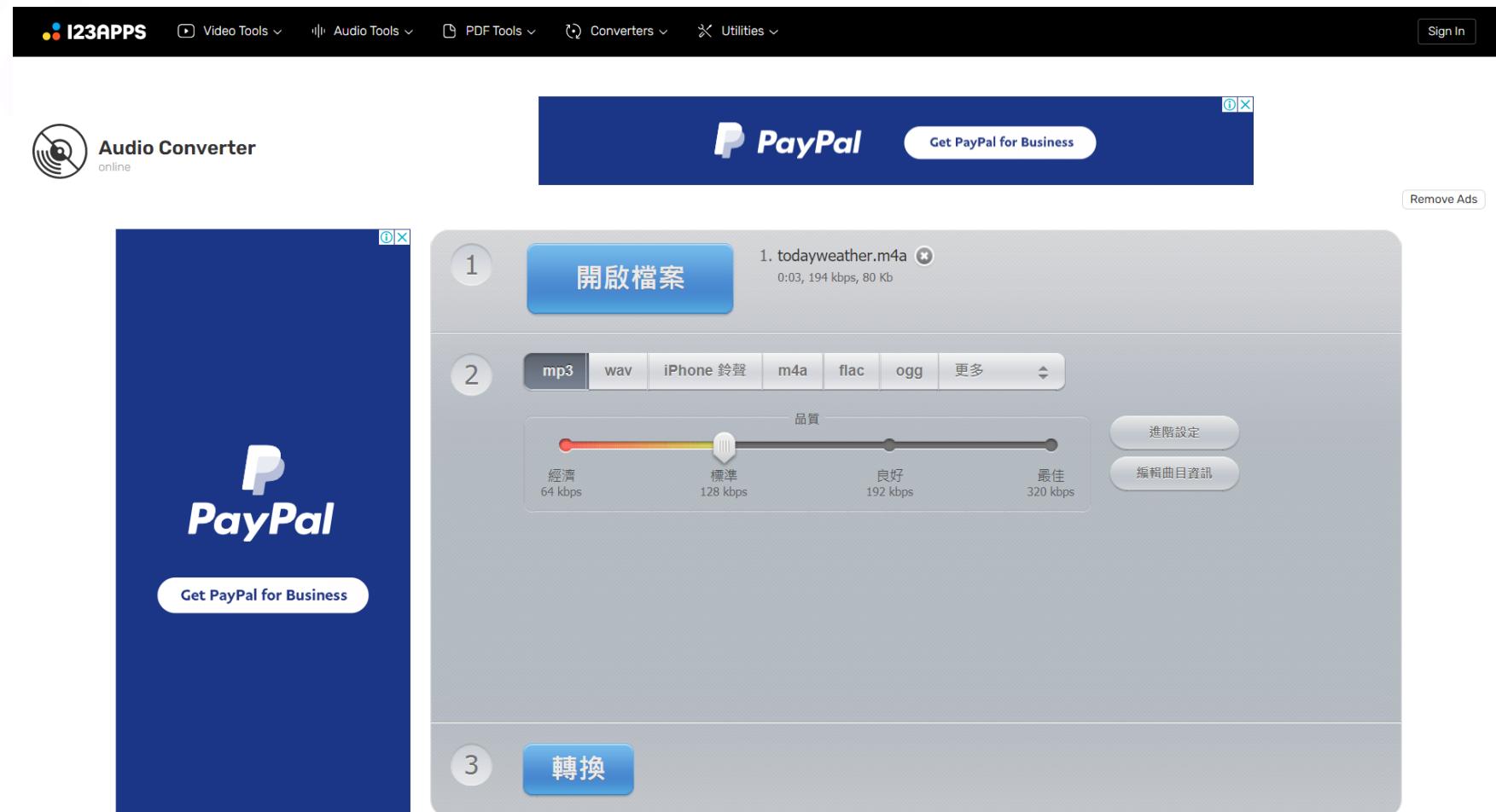
轉換語音編碼

<https://online-audio-converter.com/tw/>

The screenshot shows the 'Audio Converter online' interface on the i23APPS website. The top navigation bar includes links for Video Tools, Audio Tools, PDF Tools, Converters, and Utilities. A 'Sign In' button is in the top right. The main area has a 'PayPal' logo and a 'Get PayPal for Business' button. Step 1: '開啟檔案' (Open File) with options for Google Drive, Dropbox, or URL. Step 2: File selection dropdown showing 'mp3' selected, along with other formats like wav, iPhone 鈴聲, m4a, flac, ogg, and a '更多' (More) button. Below it is a quality slider with four levels: '經濟' (64 kbps), '標準' (128 kbps), '良好' (192 kbps), and '最佳' (320 kbps). Buttons for '進階設定' (Advanced Settings) and '編輯曲目資訊' (Edit Track Information) are on the right. Step 3: A large '轉換' (Convert) button at the bottom.

Cloud Speech-to-Text API

轉換語音編碼



The screenshot shows the i23APPS website interface with a navigation bar at the top featuring 'i23APPS' and links for 'Video Tools', 'Audio Tools', 'PDF Tools', 'Converters', and 'Utilities'. A 'Sign In' button is also present. Below the navigation, there are two main sections: 'Audio Converter online' on the left and a 'PayPal' advertisement on the right. The 'Audio Converter' section has three numbered steps: 1. '開啟檔案' (Open File) with a file listed: '1. todayweather.m4a' (0:03, 194 kbps, 80 Kb). 2. 'mp3 wav iPhone 鈴聲 m4a flac ogg 更多' (Conversion formats) with a slider for '品質' (Quality) ranging from '經濟' (64 kbps) to '最佳' (320 kbps), currently set to '標準' (128 kbps). 3. A large blue '轉換' (Convert) button.

Cloud Speech-to-Text API

轉換語音編碼

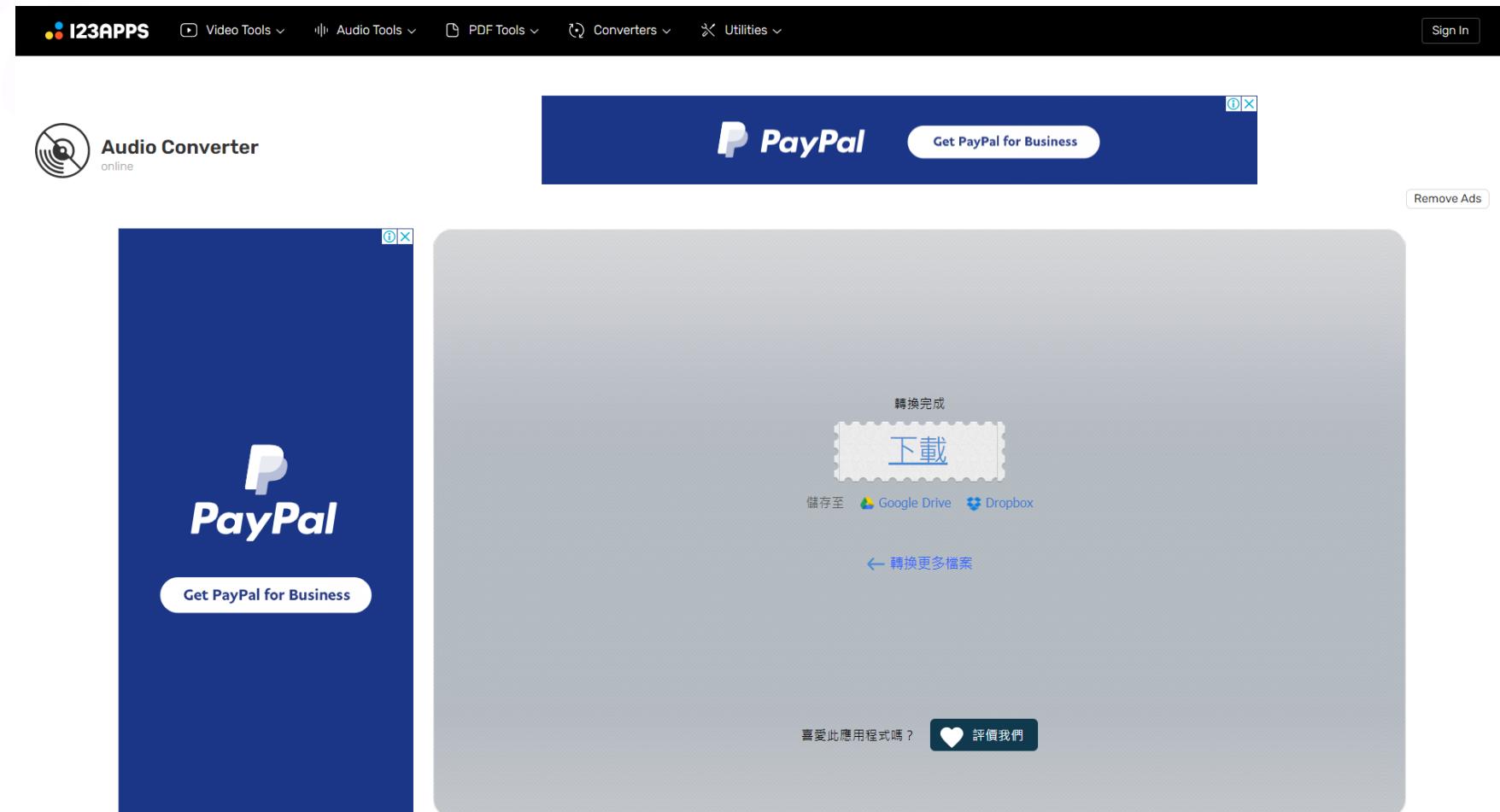
The screenshot shows the i23APPS website with a navigation bar at the top featuring links for Video Tools, Audio Tools, PDF Tools, Converters, and Utilities. A "Sign In" button is also present. Below the navigation, there are two main sections: "Audio Converter online" on the left and a "PayPal" landing page on the right.

Audio Converter online: This section displays the "PayPal" logo and a "Get PayPal for Business" button. It includes a "Remove Ads" link in the bottom right corner.

PayPal Landing Page: This section shows a file selection step (1) where "todayweather.m4a" is selected. Step (2) shows conversion options: format (mp3), quality slider (set to 128 kbps), bit rate (128 kbps), sample rate (44100 KHz), channels (2), and effects (none). Step (3) is labeled "轉換" (Convert).

Cloud Speech-to-Text API

轉換語音編碼



Cloud Speech-to-Text API

價格

<https://cloud.google.com/speech-to-text> > 定價

Cloud Speech-to-Text API

1. 啟用 API
2. 建立轉錄工作
3. 查看結果

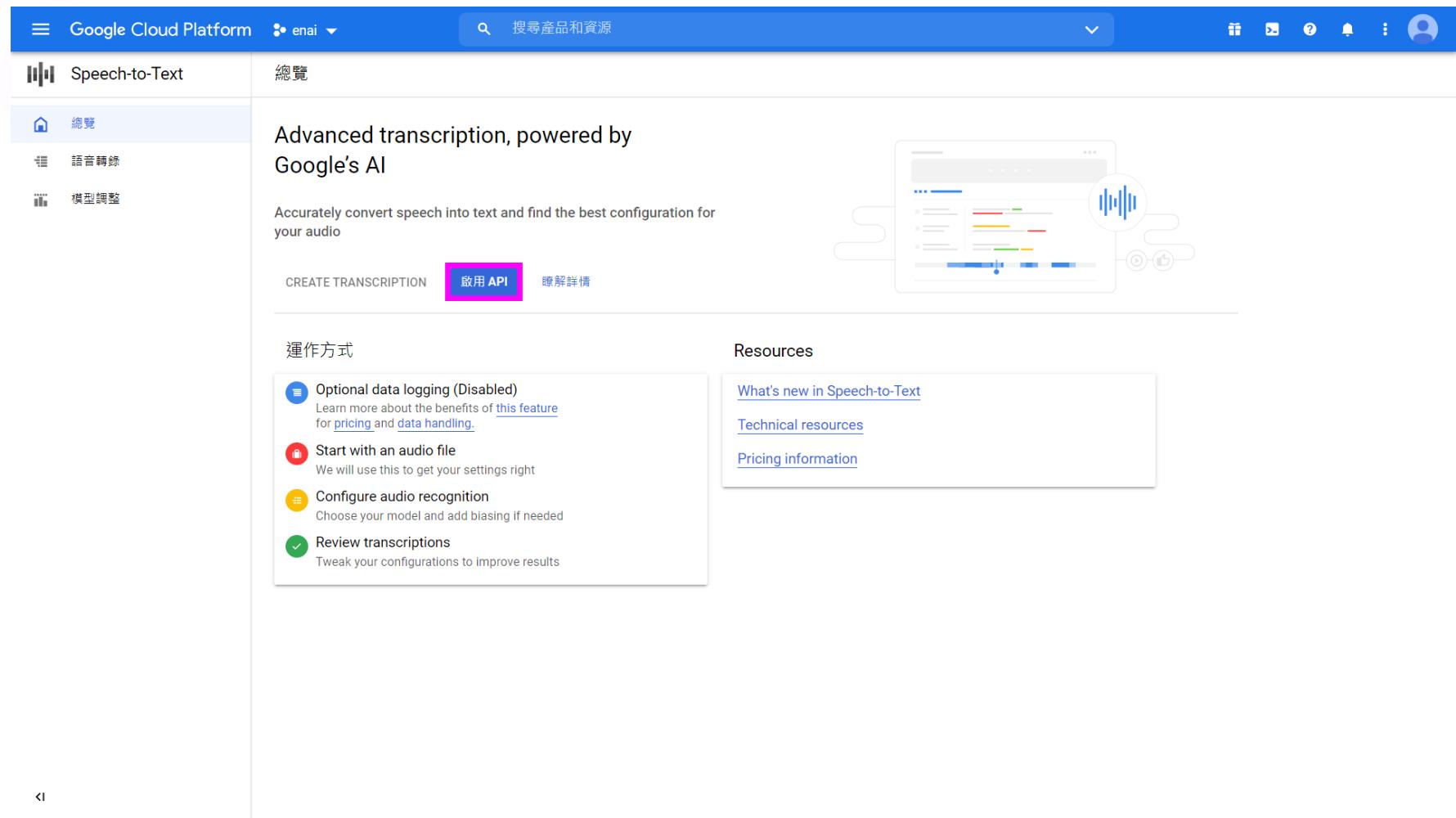
Cloud Speech-to-Text API

1. 啟用 API

The screenshot shows the Google Cloud Platform interface. The left sidebar lists various services: 首頁, 近期, 建議 AI, 零售, Speech-to-Text (highlighted with a pink box), 資料表, Talent Solution, Translation, Video Intelligence, Vision, 遊戲伺服器, and Google 地圖平台. The main content area displays the 'API API' page for the Speech-to-Text API. It includes a chart titled 'API API' showing '要求 (每秒要求數)' (Requests per second) over time from 9:30 to 10:15. A note states: '⚠ No data is available for the selected time frame.' Below the chart is a link to '前往 API 總覽'. To the right of the main content are three panels: 'Google Cloud Platform 服務狀態' (Status), 'Monitoring' (Monitoring), and 'API Error Reporting' (API Error Reporting). The status panel shows 'Cloud Spanner' with a warning about missing metrics. The monitoring panel has links for setting up alerts and checking operational times. The error reporting panel indicates no errors have been reported.

Cloud Speech-to-Text API

1. 啟用 API



The screenshot shows the Google Cloud Platform interface for the Speech-to-Text API. The top navigation bar includes the Google Cloud Platform logo, user account information (enai), a search bar, and various navigation icons. The main content area has a blue header "Speech-to-Text" and a sub-header "總覽". On the left, there's a sidebar with three options: "總覽" (selected), "語言轉譯" (Translation), and "模型調整" (Model Tuning). The main content area features a large image of a smartphone displaying a waveform, with text overlay: "Advanced transcription, powered by Google's AI" and "Accurately convert speech into text and find the best configuration for your audio". Below this are three buttons: "CREATE TRANSCRIPTION", "啟用 API" (which is highlighted with a pink box), and "瞭解詳情". To the right, there are sections for "運作方式" (Working Mode) containing four items: "Optional data logging (Disabled)", "Start with an audio file", "Configure audio recognition", and "Review transcriptions"; and a "Resources" section with links: "What's new in Speech-to-Text", "Technical resources", and "Pricing information".

Cloud Speech-to-Text API

2. 建立轉錄工作

The screenshot shows the Google Cloud Platform Speech-to-Text API interface. At the top, there's a navigation bar with the Google Cloud Platform logo, a user dropdown, a search bar containing '搜尋產品和資源', and several icons for account and notifications.

The main content area has a title 'Speech-to-Text' and a sub-section '總覽'. Below this, there are three navigation links: '總覽' (selected), '語言轉譯', and '模型調整'. The main content area features a heading 'Advanced transcription, powered by Google's AI' and a sub-heading 'Accurately convert speech into text and find the best configuration for your audio'. A large blue button labeled 'CREATE TRANSCRIPTION' is prominently displayed. To the right of this button is a diagram illustrating the transcription process, showing a waveform being processed by a central box with various colored lines and arrows indicating data flow.

Below the main content, there are two sections: '運作方式' (Operation Mode) and 'Resources'.

- 運作方式:**
 - Start with an audio file**: We will use this to get your settings right
 - Configure audio recognition**: Choose your model and add biasing if needed
 - Review transcriptions**: Tweak your configurations to improve results
- Resources:**
 - [What's new in Speech-to-Text](#)
 - [Technical resources](#)
 - [Pricing information](#)

Cloud Speech-to-Text API

2. 建立轉錄工作 a. 建立工作區

The screenshot shows the Google Cloud Platform interface for creating a new transcription. The top navigation bar includes the Google Cloud Platform logo, user account (enai), search bar, and various icons. The left sidebar for 'Speech-to-Text' has three options: '總覽' (Overview), '語音轉錄' (Speech-to-Text, highlighted in blue), and '模型調整' (Model Tuning). The main content area is titled 'New Transcription' and shows the 'Audio Configuration' step. It includes instructions to review best practices for speech data optimization. Under 'Choose an audio file', there are two options: 'Cloud Storage' (radio button) and 'Local upload'. A dropdown menu for 'Encoding type' is open, showing 'Encoding *'. Below that, a field for '取樣率' (Sampling rate) is set to 'Sample rate (Hertz) *'. The 'Channel count' section allows specifying the number of channels present in the recording, with a note about pricing. A checkbox for 'Enable separate recognition per channel' is available. At the bottom right is a '繼續' (Next) button.

Cloud Speech-to-Text API

2. 建立轉錄工作 a. 建立工作區

The screenshot shows the Google Cloud Platform Speech-to-Text interface for creating a new transcription. On the left, there's a sidebar with tabs: '總覽' (Overview), '語音轉錄' (Speech-to-Text, highlighted in blue), and '模型調整' (Model Tuning). The main area has a title 'New Transcription' with a back arrow. A dropdown menu titled '工作區' (Workspace) is open, showing 'No previously setup workspaces' and a button labeled 'NEW WORKSPACE' which is highlighted with a pink rectangle. Below this, there are three numbered steps: 'Transcription options' (step 2) and 'Model adaptation' (step 3). To the right, there are several configuration sections: 'Audio' (with a note about best practices for audio import), 'Choose an audio file' (radio buttons for 'Cloud Storage' and 'Local upload'), 'Encoding type' (a dropdown menu currently set to 'Encoding *'), '取樣率' (Sampling rate) with a field for 'Sample rate (Hertz)' containing '8000', 'Channel count' (a dropdown menu currently set to 'Channel count'), and a note about processing multiple channels. At the bottom right is a '繼續' (Continue) button.

Cloud Speech-to-Text API

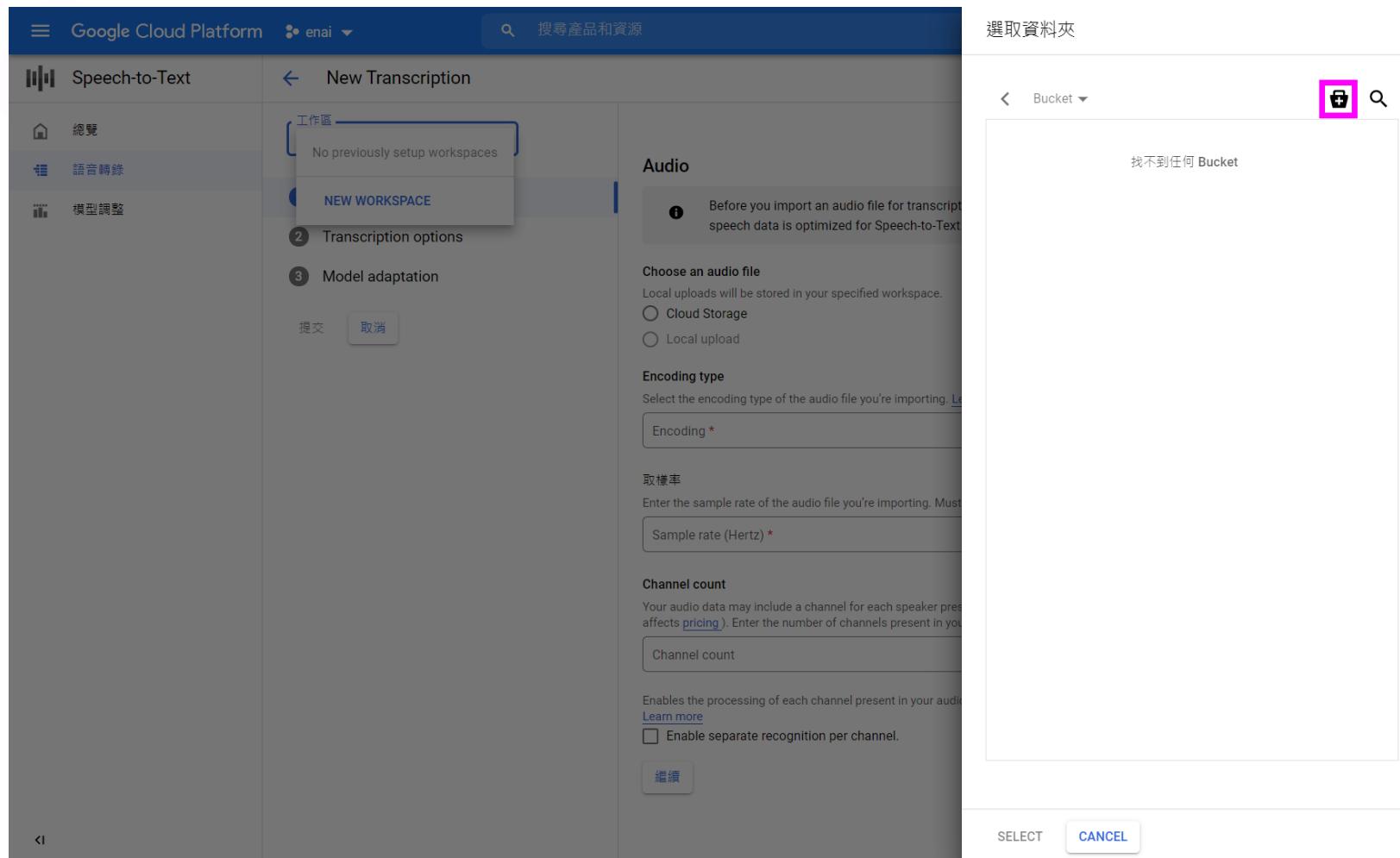
2. 建立轉錄工作 a. 建立工作區

The screenshot shows the Google Cloud Platform (GCP) interface for the Speech-to-Text service. The user is in the 'New Transcription' section. A dropdown menu is open under the 'Workspace' label, showing options: 'No previously setup workspaces' and 'NEW WORKSPACE'. The 'NEW WORKSPACE' option is highlighted. To the right, there is a detailed configuration form for creating a new workspace:

- 建立新的工作區** (Create New Workspace)
- GCS location *** (GCS location): A field with a 'BROWSE' button highlighted with a pink box.
- Audio**:
 - Before you import an audio file for transcription, speech data is optimized for Speech-to-Text.
 - Choose an audio file**: Local uploads will be stored in your specified workspace.
 - Cloud Storage
 - Local upload
 - Encoding type**: Select the encoding type of the audio file you're importing. [Learn more](#).
Encoding *
 - 取樣率**: Enter the sample rate of the audio file you're importing. Must be between 8000 and 192000 Hz.
Sample rate (Hertz) *
 - Channel count**: Your audio data may include a channel for each speaker present (which affects [pricing](#)). Enter the number of channels present in your audio.
Channel count
 - Enable separate recognition per channel**:
 - Enable separate recognition per channel.
- 繼續** (Continue)

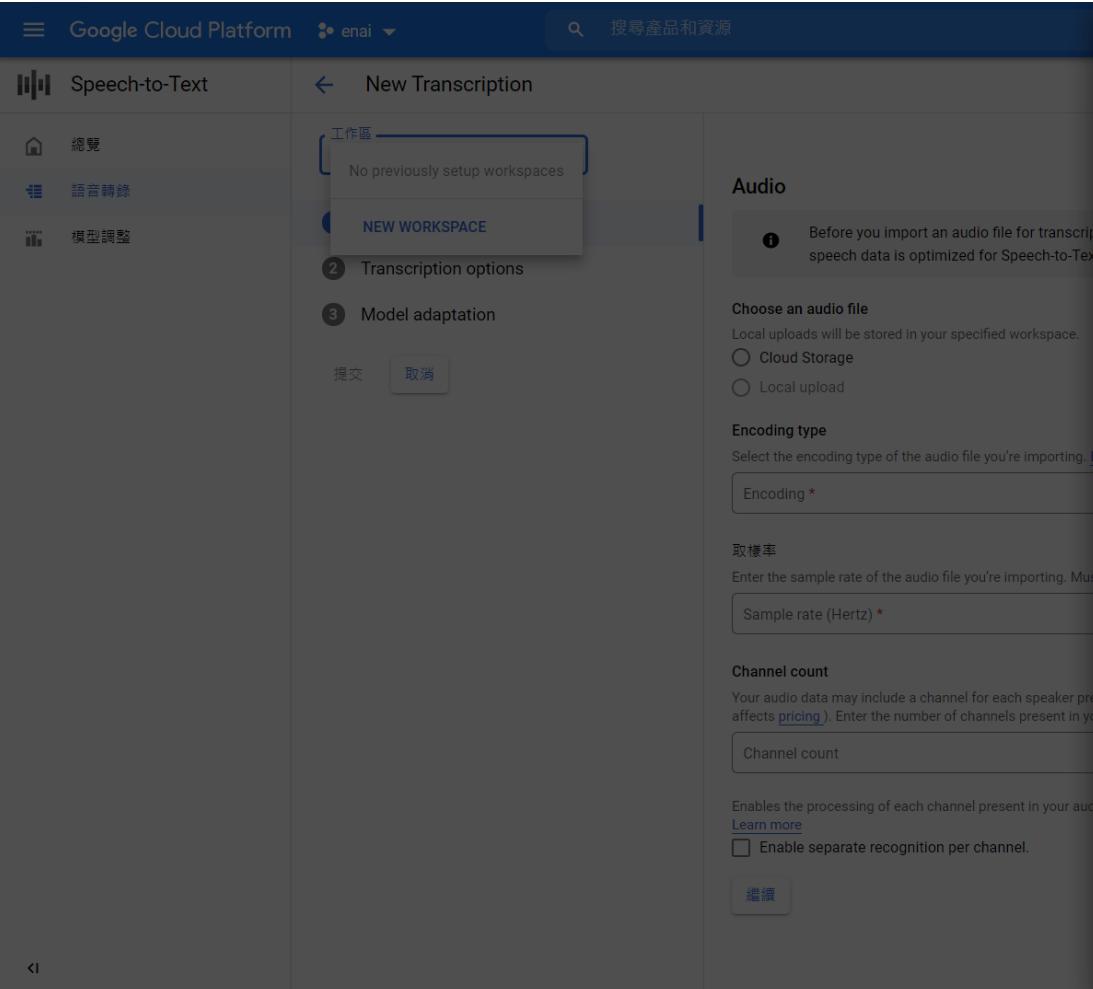
Cloud Speech-to-Text API

2. 建立轉錄工作 a. 建立工作區



Cloud Speech-to-Text API

2. 建立轉錄工作 a. 建立工作區



The screenshot shows the 'New Transcription' workspace creation interface in the Google Cloud Platform. On the left, there's a sidebar with 'Speech-to-Text' selected, showing options like '總覽', '語言轉錄', and '模型調整'. The main area has a heading '建立值區' (Create Workspace). It includes steps: 1. 為值區命名 (Name workspace), with a note about uniqueness and a field containing 'enaiworld' highlighted with a pink border. 2. 選取資料的儲存位置 (Select storage location), showing 'us' (Multi-region) as the location and 'Multi-region' as the type. 3. 為資料選擇預設備存空間級別 (Select pre-allocated storage tier), showing 'Standard'. 4. 選取如何控制物件的存取權 (Select object access control), showing '已使用' (Used) under '禁止公開存取' (Restrict public access) and '統一' (Unified) under '存取權控管' (Access control). 5. 選擇保護物件資料的方式 (Select data protection method), showing '無' (None) under '保護工具' (Protection tools) and 'Google-managed key' under '資料加密' (Data encryption). At the bottom right are '建立' (Create) and '取消' (Cancel) buttons.

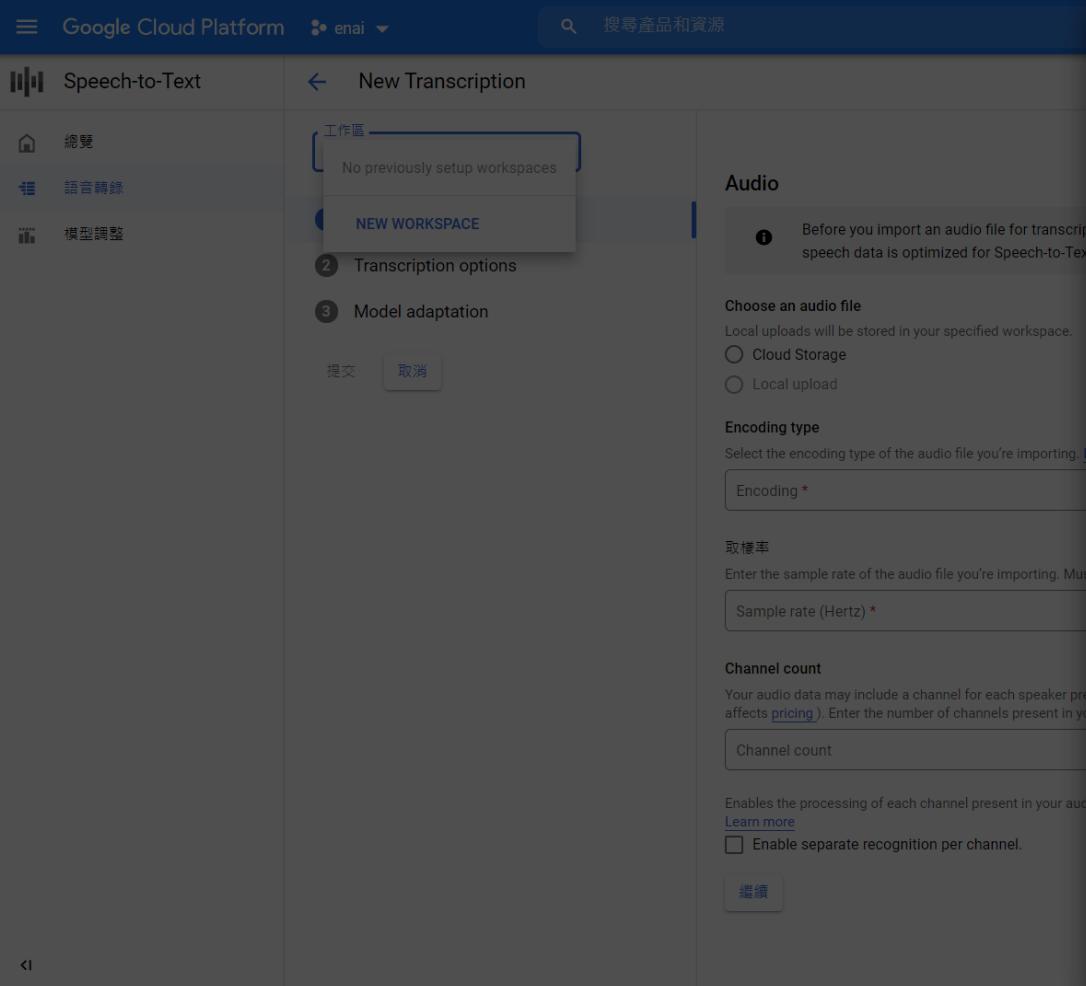
建立值區

- 為值區命名
請挑選一個全域不重複的永久名稱。[命名規範](#)
 提示：請勿包含任何機密資訊
- 繼續

- 選取資料的儲存位置
位置 : us (多個美國地區)
位置類型 : Multi-region
- 為資料選擇預設備存空間級別
預設備存空間級別 : Standard
- 選取如何控制物件的存取權
禁止公開存取 : 已使用
存取權控管 : 統一
- 選擇保護物件資料的方式
保護工具 : 無
資料加密 : Google-managed key

Cloud Speech-to-Text API

2. 建立轉錄工作 a. 建立工作區



The screenshot shows the 'New Transcription' page in the Google Cloud Platform Speech-to-Text interface. On the left, there's a sidebar with 'Speech-to-Text' selected. The main area has a heading 'New Transcription' with a back arrow. A dropdown menu '工作區' is open, showing 'No previously setup workspaces' and a highlighted 'NEW WORKSPACE' option. Below this are sections for 'Transcription options' and 'Model adaptation'. To the right, there's an 'Audio' section with instructions about importing audio files and options for 'Cloud Storage' or 'Local upload'. Further down are sections for 'Encoding type', '取樣率' (Sampling rate), 'Channel count', and a checkbox for 'Enable separate recognition per channel'. At the bottom are '繼續' (Continue) and '建立' (Create) buttons.

建立值區

- 為值區命名
名稱：enaiworld
- 選取資料的儲存位置
這個選項會決定儲存資料的地理位置，並影響費用、效能和可用性，而且一經選擇即無法變更。[瞭解詳情](#)

位置類型

- Multi-region
可用性最高，涵蓋範圍最大
- Dual-region
可在 2 個地區中提供高可用性和低延遲
- Region
可在單一地區中提供最低延遲

位置

- us-east1 (南卡羅來納州)

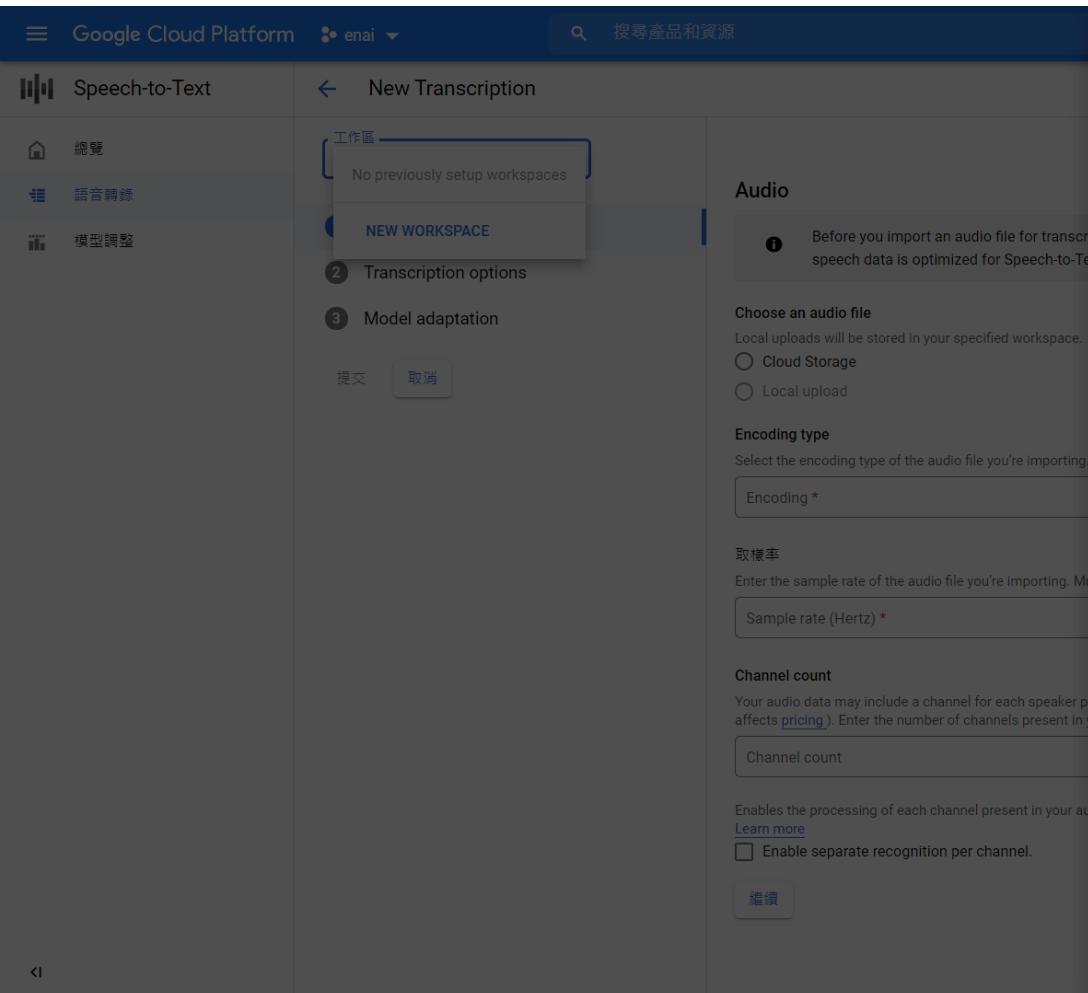
繼續

- 為資料選擇預設儲存空間級別
預設儲存空間級別：Standard
- 選取如何控制物件的存取權
禁止公開存取：已停用
存取權控管：統一
- 選擇保護物件資料的方式
保護工具：無
資料加密：Google-managed key

建立 取消

Cloud Speech-to-Text API

2. 建立轉錄工作 a. 建立工作區



The screenshot shows the 'New Transcription' page in the Google Cloud Platform Speech-to-Text interface. On the left, there's a sidebar with 'Speech-to-Text' selected, and a 'NEW WORKSPACE' button highlighted. The main area has sections for 'Audio' (choose an audio file from Cloud Storage or Local upload), 'Encoding type' (set to 'Standard'), 'Sample rate (Hertz)' (set to 16000), 'Channel count' (set to 1), and 'Enable separate recognition per channel' (unchecked). A '繼續' (Continue) button is at the bottom right. To the right of the form, a sidebar titled '建立值區' (Create workspace) lists configuration steps:

- 為值區命名 (Checkmarked): Name: enaiworld
- 選取資料的儲存位置 (Listed):

這個選項會決定儲存資料的地理位置，並影響費用、效能和可用性，而且一經選擇即無法變更。[瞭解詳情](#)

 - Multi-region (Radio button): 可用性最高，涵蓋範圍最大
 - Dual-region (Radio button): 可在 2 個地區中提供高可用性和低延遲
 - Region (Radio button, selected): 可在單一地區中提供最低延遲
- 位置 (Listed): us-central1 (愛荷華州)
- 繼續 (Listed)
- 為資料選擇預設備儲存空間級別 (Listed):

預設備儲存空間級別：Standard
- 選取如何控制物件的存取權 (Listed):

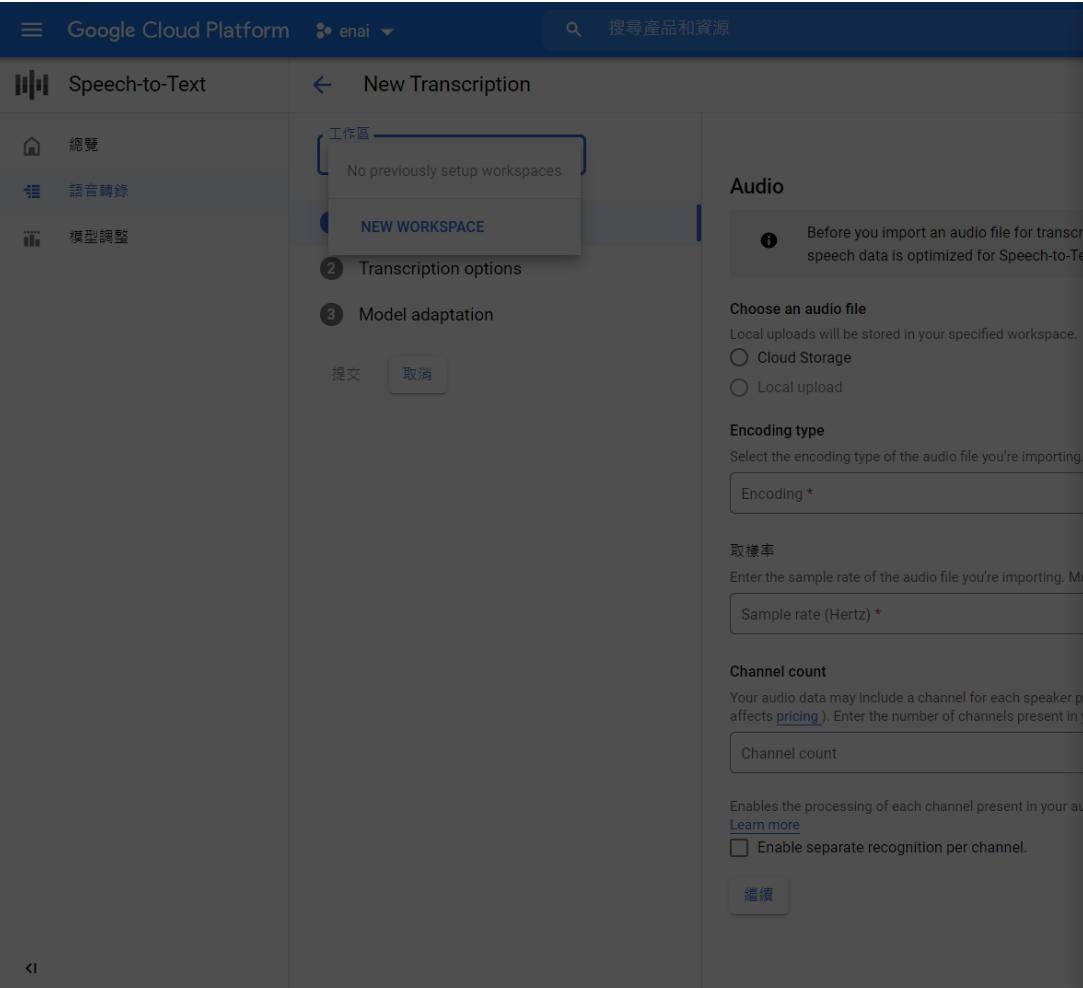
禁止公開存取：已停用
存取權控管：統一
- 選擇保護物件資料的方式 (Listed):

保護工具：無
資料加密：Google-managed key

At the bottom right of the sidebar are '建立' (Create) and '取消' (Cancel) buttons.

Cloud Speech-to-Text API

2. 建立轉錄工作 a. 建立工作區



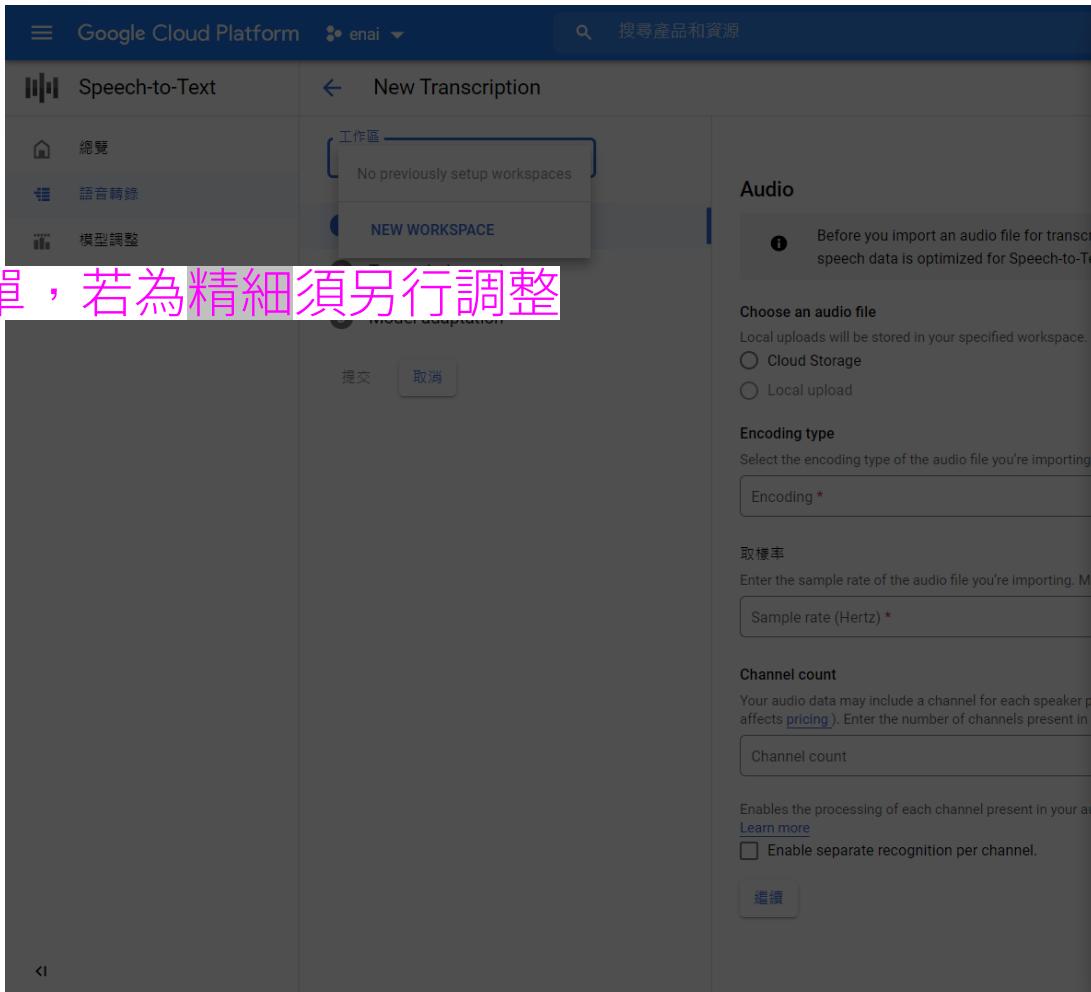
The screenshot shows the 'New Transcription' page in the Google Cloud Platform Speech-to-Text section. On the left, there's a sidebar with 'Speech-to-Text' selected, showing '總覽', '語言轉譯', and '模型調整'. The main area has a heading '建立值區' and several configuration sections:

- 工作區**: A dropdown menu is open, showing 'No previously setup workspaces' and a highlighted 'NEW WORKSPACE' option.
- Audio**: A note says 'Before you import an audio file for transcription, speech data is optimized for Speech-to-Text'. It includes 'Choose an audio file' (Cloud Storage or Local upload), 'Encoding type' (dropdown), '取樣率' (Sample rate (Hertz) input field), 'Channel count' (input field), and a checkbox for 'Enable separate recognition per channel'.
- 建立值區** (right side):
 - 為值區命名**: Checked, with '名稱: enaiworld'.
 - 選取資料的儲存位置**: Checked, with '位置: us-central1 (麥荷華州)' and '位置類型: Region'.
 - 為資料選擇預設儲存空間級別**:
 - Standard (selected)
 - Nearline
 - Coldline
 - Archive
 - 繼續** (button)
 - 選取如何控制物件的存取權**:
 - 禁止公開存取: 已停用
 - 存取權控管: 統一
 - 選擇保護物件資料的方式**:
 - 保護工具: 無
 - 資料加密: Google-managed key
- 建立** (button) and **取消** (button) at the bottom right.

Cloud Speech-to-Text API

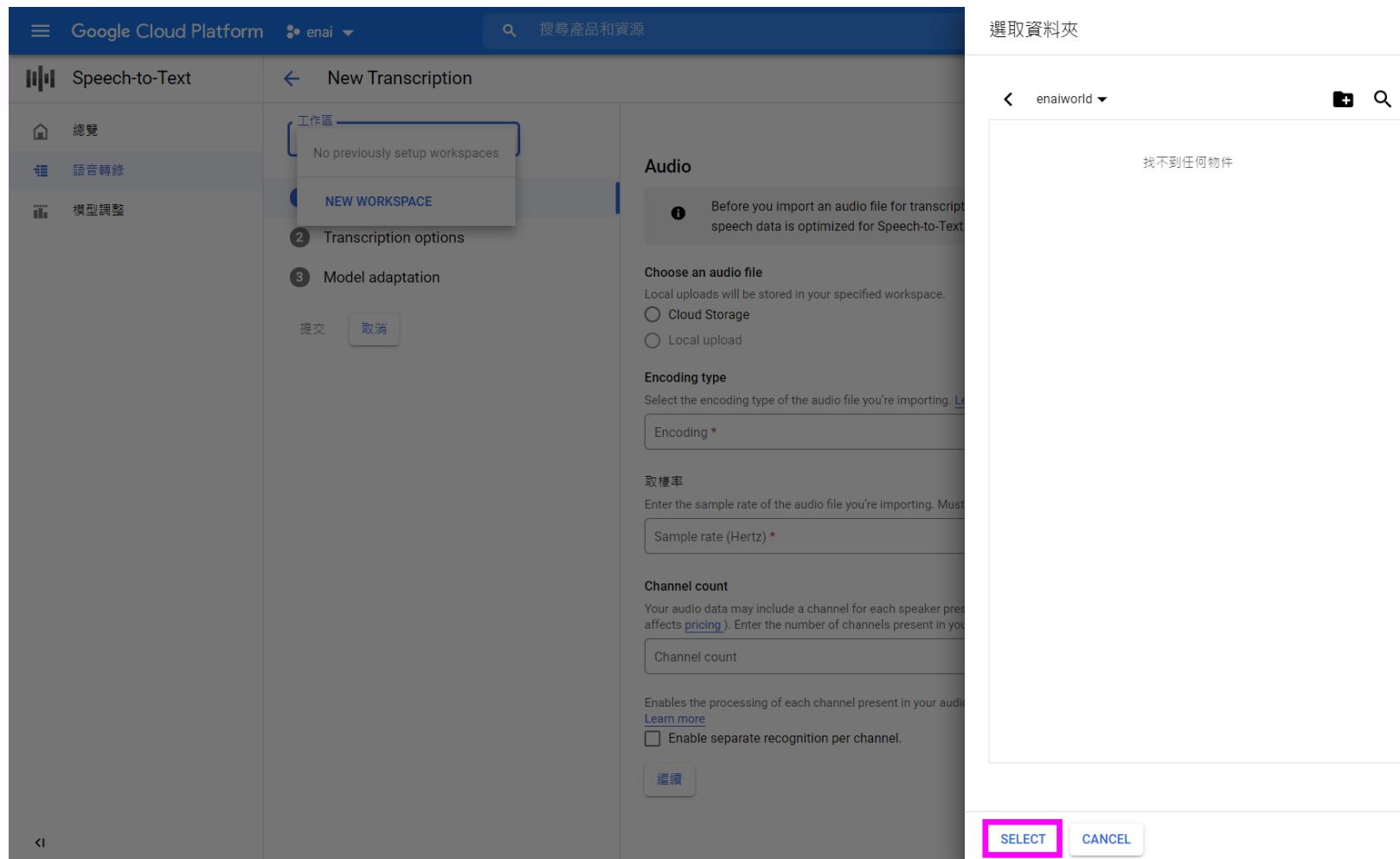
2. 建立轉錄工作 a. 建立工作區

存取權統一較簡單，若為精細須另行調整



Cloud Speech-to-Text API

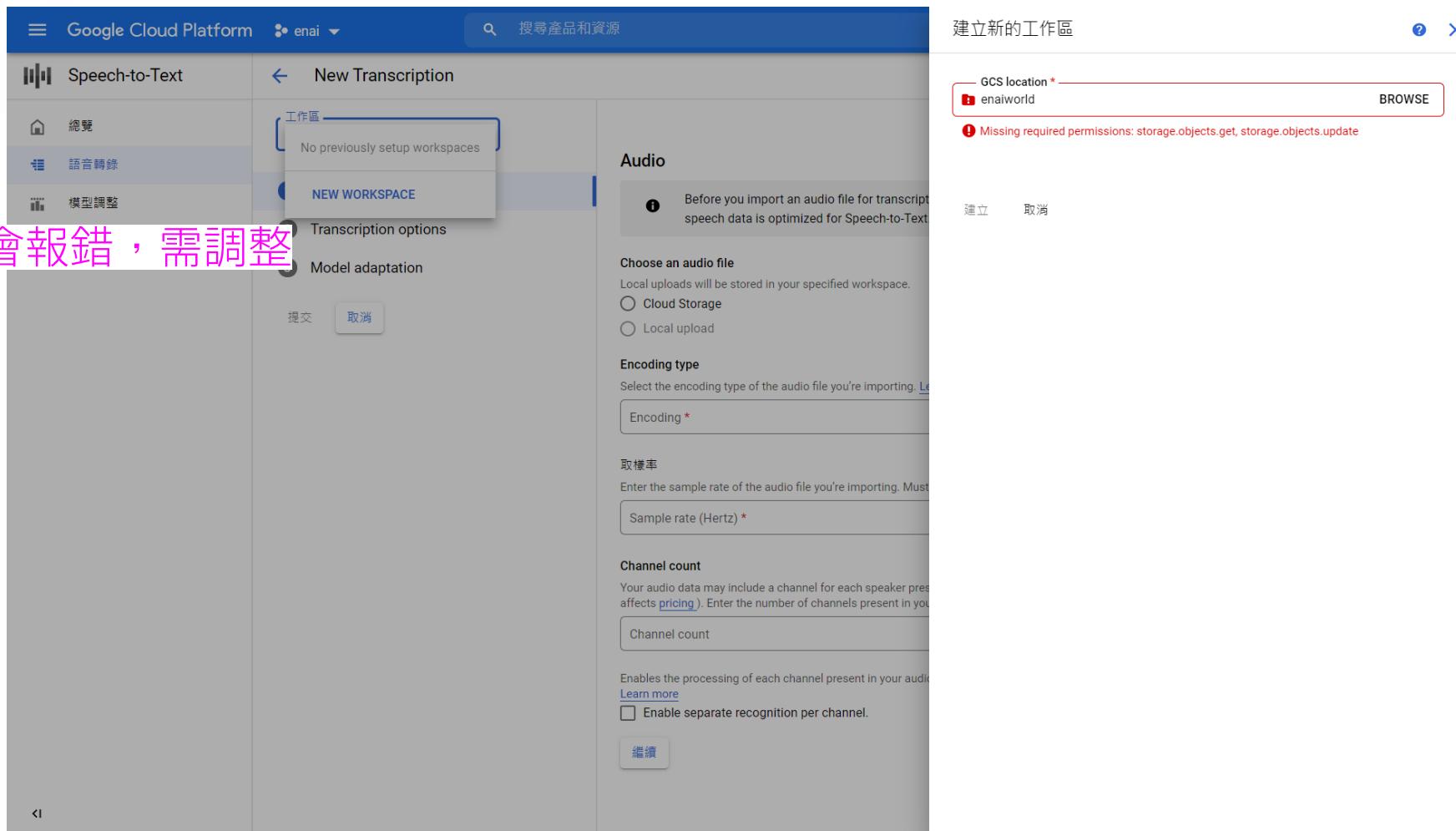
2. 建立轉錄工作 a. 建立工作區



Cloud Speech-to-Text API

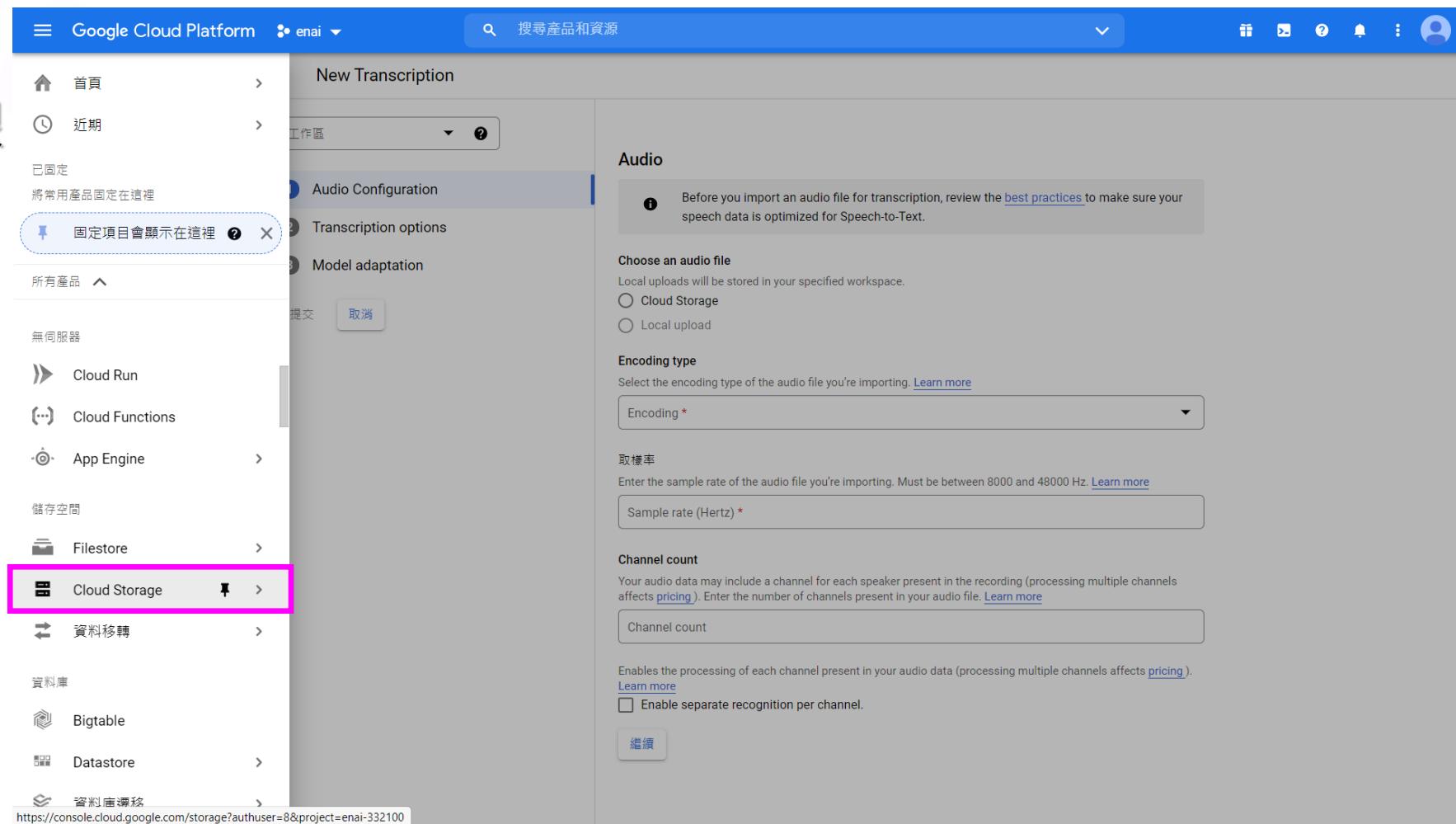
2. 建立轉錄工作 a. 建立工作區

存取權若為精細會報錯，需調整



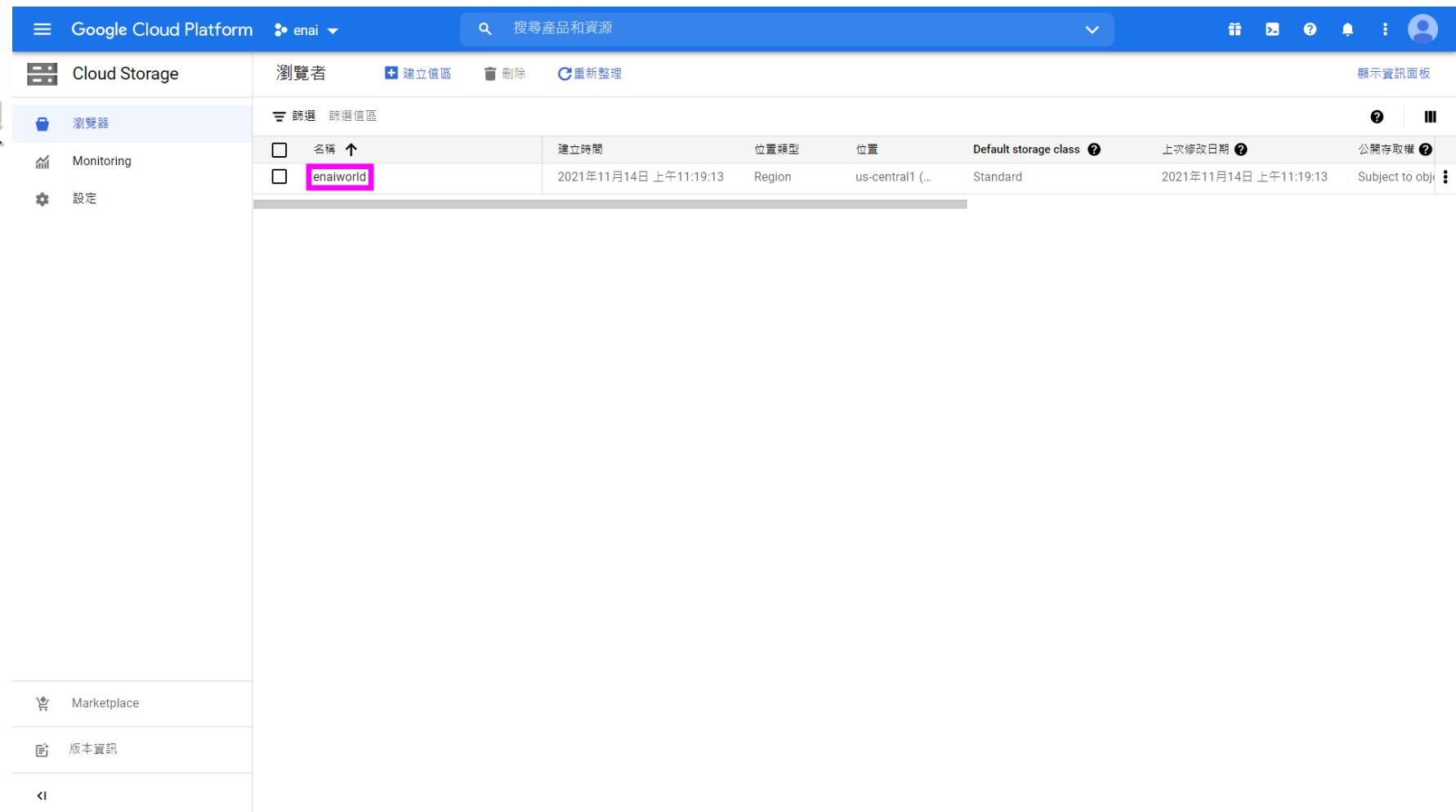
Cloud Speech-to-Text API

2. 建立轉錄工作 b. 調整值區權限



Cloud Speech-to-Text API

2. 建立轉錄工作 b. 調整值區權限

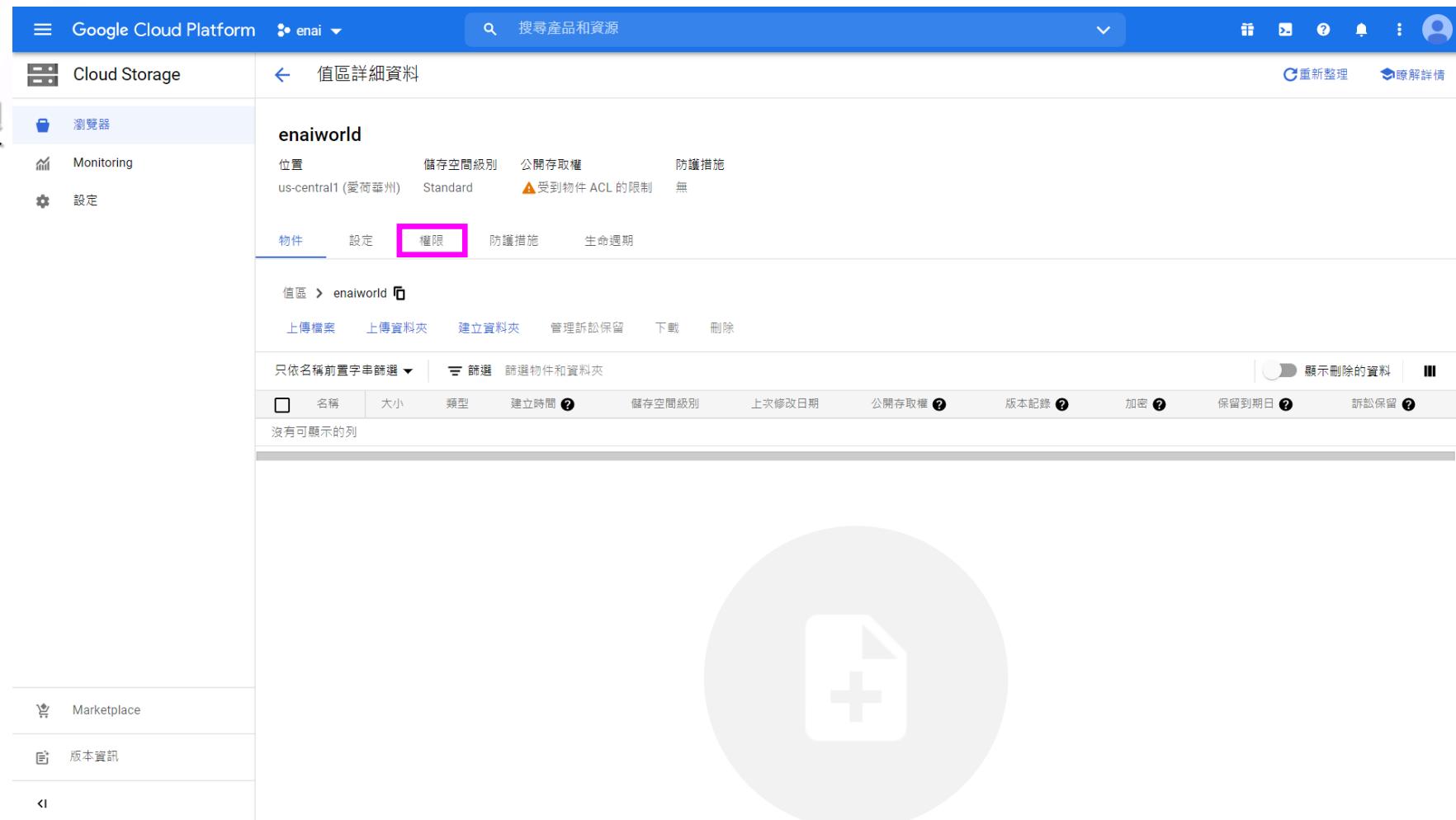


The screenshot shows the Google Cloud Platform interface for Cloud Storage. The left sidebar has 'Cloud Storage' selected. The main area displays a table of buckets. One row is highlighted with a pink box around the bucket name 'enaiworld'. The columns in the table are: Name, Create Time, Location Type, Location, Default storage class, Last modified, and Public access. The 'enaiworld' row shows: enaiworld, 2021年11月14日上午11:19:13, Region, us-central1 (...), Standard, 2021年11月14日上午11:19:13, Subject to obj.

Name	Create Time	Location Type	Location	Default storage class	Last modified	Public access
enaiworld	2021年11月14日上午11:19:13	Region	us-central1 (...)	Standard	2021年11月14日上午11:19:13	Subject to obj.

Cloud Speech-to-Text API

2. 建立轉錄工作 b. 調整值區權限



The screenshot shows the Google Cloud Platform Cloud Storage interface. The left sidebar has 'Cloud Storage' selected. The main area shows a bucket named 'enaiworld'. The 'Permissions' tab is highlighted with a pink box. The bucket details show it is located in 'us-central1 (愛荷華州)', has 'Standard' storage class, and is '受到物件 ACL 的限制' (restricted by object ACL). Below the details, there are tabs for '物件' (Objects), '設定' (Settings), '權限' (Permissions), '防護措施' (Protection measures), and '生命週期' (Lifecycle). The '權限' tab is active. A large circular button with a plus sign is visible at the bottom right.

Cloud Speech-to-Text API

2. 建立轉錄工作 b. 調整值區權限

The screenshot shows the Google Cloud Platform interface for Cloud Storage. The main title bar says "Google Cloud Platform" and "enai". The left sidebar has "Cloud Storage" selected, along with "瀏覽器", "Monitoring", and "設定". The main content area shows a bucket named "enaiworld" with details: "位置" (us-central1 (愛荷華州)), "儲存空間級別" (Standard), "公開存取權" (受物件 ACL 的限制), and "防護措施" (無). Below this, tabs for "物件", "設定", "權限" (selected), "防護措施", and "生命週期" are visible. The "權限" section contains a warning about public access via ACL, a link to "避免公開存取" (Avoid public access), and a "切換至統一權限" (Switch to unified permissions) button. It also includes "新增" (Add) and "移除" (Remove) buttons. A table lists three users with their roles: "enai-332100 專案的編輯者" (Storage 繼承 Bucket 擁有者), "enai-332100 專案的擁有者" (Storage 繼承 Bucket 擁有者), and "enai-332100 專案的檢視者" (Storage 繼承 Bucket 讀取者). The "檢視方式" dropdown is set to "主體". The bottom navigation bar includes "Marketplace", "版本資訊", and a back arrow.

Cloud Speech-to-Text API

2. 建立轉錄工作 b. 調整值區權限

The screenshot shows the 'Permissions' tab of a Cloud Storage bucket named 'enaiworld'. The main panel displays the 'Public Access' section, which includes a warning about ACLs and a note about avoiding public access. Below this is a 'Permissions' table with three rows:

Type	Subject	Name	Role
<input type="checkbox"/>	「enai-332100」專案的編輯者	Storage 编辑 Bucket 讀取者	Storage Editor
<input type="checkbox"/>	「enai-332100」專案的擁有者	Storage Owner	Storage Owner
<input type="checkbox"/>	「enai-332100」專案的檢視者	Storage Viewer	Storage Viewer

To the right, a sidebar titled 'Edit Permissions' shows the 'Role' dropdown set to 'Storage 编辑 Bucket 讀取者' and a link to 'Add conditions'. A button labeled '+ Add other roles' is highlighted with a pink box.

Cloud Speech-to-Text API

2. 建立轉錄工作 b. 調整值區權限

The screenshot shows the Google Cloud Platform interface for managing Cloud Storage buckets. On the left, the Cloud Storage navigation menu is visible. In the center, the 'enaiworld' bucket details page is shown, specifically the 'Permissions' tab under the 'Public Access' section. A warning message about ACLs is present. Below it, there's a 'Prevent public access' link. At the bottom, there are 'Permissions' and 'Add role' buttons. To the right, the 'Edit Permissions' panel is open, displaying two entries:

Role	Principal	Condition
Storage Bucket Reader	'enai-332100' project viewer	Add condition
Storage Admin	'enai-332100' project owner	Add condition

At the bottom right of the permissions panel, there are 'Save' and 'Cancel' buttons.

Cloud Speech-to-Text API

2. 建立轉錄工作 b. 調整值區權限

The screenshot shows the Google Cloud Platform Cloud Storage interface. The left sidebar has 'Cloud Storage' selected. The main page displays a bucket named 'enaiworld'. The 'Access control' section indicates that object-level ACLs are enabled. It provides a warning about the impact of ACLs on public access and a link to learn more. Below this, there's a 'Switch to uniform access control' button. The 'Permissions' section lists three users with specific roles: 'Storage Inheritor Bucket Owner', 'Storage Inheritor Bucket Owner', and 'Storage Manager'. The 'Storage Manager' role is highlighted with a pink border.

Google Cloud Platform enai 搜尋產品和資源

Cloud Storage 值區詳細資料 enaiworld

位置 儲存空間級別 公開存取權 防護措施

us-central1 (愛荷華州) Standard ▲受到物件 ACL 的限制 無

物件 設定 權限 防護措施 生命週期

公開存取權 Access control

▲ 取決於物件 ACL

如果這個值區中有一或多個物件的存取權限是授予 `allUsers` 或 `allAuthenticatedUsers`，網際網路中的使用者就能公開存取相關物件。請查看各個物件的權限，確認是否設為公開。

如要簡化權限設定，請改用統一存取權控管方式。如果物件完全不應開放公開存取，請一併禁止公開存取這個值區。[瞭解詳情](#)

避免公開存取 切換至統一權限

權限 [新增](#) [移除](#)

檢視方式： [主體](#) [角色](#)

篩選 輸入屬性名稱或值

類型	主體 ↑	名稱	角色	繼承
<input type="checkbox"/>	「enai-332100」專案的編輯者	Storage 繼承 Bucket 擁有者		
<input type="checkbox"/>	「enai-332100」專案的擁有者	Storage 繼承 Bucket 擁有者		
<input type="checkbox"/>	「enai-332100」專案的檢視者	Storage 管理員		
		Storage 繼承 Bucket 讀取者		

Cloud Speech-to-Text API

2. 建立轉錄工作

a. 建立工作區

權限正確，建立

若曾調整權限，請重新建立工作區至此步驟

The screenshot shows the Google Cloud Platform Speech-to-Text interface. On the left, there's a sidebar with 'Speech-to-Text' selected. In the main area, a modal window titled 'New Transcription' is open. A dropdown menu under 'Workspace' has 'NEW WORKSPACE' selected. To the right, there's a form for audio settings, including fields for 'Choose an audio file' (with options for 'Cloud Storage' or 'Local upload'), 'Encoding type' (set to 'Encoding *'), 'Sample rate (Hertz)' (set to '16000'), 'Channel count' (set to '2'), and a checkbox for 'Enable separate recognition per channel'. At the bottom right of the modal is a blue 'Create' button. To the right of the modal, a separate window titled '建立新的工作區' (Create New Workspace) shows a 'Cloud location' field containing 'enaiworld' with a 'BROWSE' button, and a 'Create' button at the bottom.

Cloud Speech-to-Text API

2. 建立轉錄工作 c. 設定音檔

The screenshot shows the Google Cloud Platform interface for the Speech-to-Text API. The top navigation bar includes the Google Cloud Platform logo, a user dropdown, a search bar with the term 'speech', and standard browser controls. The main title is 'New Transcription'. On the left, a sidebar menu has three items: '總覽' (Overview), which is selected and highlighted in blue; '語音轉錄' (Speech-to-Text), which is also highlighted in blue; and '模型調整' (Model adaptation). The main content area is titled 'Audio Configuration' and contains the following steps:

- 1 Audio Configuration**: A note says: "Before you import an audio file for transcription, review the [best practices](#) to make sure your speech data is optimized for Speech-to-Text." It includes a section for "Choose an audio file" where the "Local upload" option is selected (highlighted with a pink box) and another for "Encoding type".
- 2 Transcription options**: A note says: "Local uploads will be stored in your specified workspace." It includes sections for "取樣率" (Sampling rate) and "Channel count".
- 3 Model adaptation**: A note says: "Your audio data may include a channel for each speaker present in the recording (processing multiple channels affects [pricing](#)). Enter the number of channels present in your audio file." It includes a section for "Enable separate recognition per channel".

At the bottom right of the main form, there is a button labeled "繼續" (Continue).

Cloud Speech-to-Text API

2. 建立轉錄工作 c. 設定音檔

檔案限制 : .aac .flac .m4a .mogg .mp3 .mp4 .oga
.ogg .opus .raw .wav .wma

編碼限制 : AMR AMR_WB_ENCODING_UNSPECIFIED
FLAC LINEAR16 MP3 MULAW OGG_OPUS
SPEEX_WITH_HEADER_BYTE WEBM_OPUS

取樣率 : 8000Hz ~ 48000Hz

The screenshot shows the Google Cloud Platform interface for creating a new transcription. The left sidebar has 'Speech-to-Text' selected under '語音轉錄'. The main page title is 'New Transcription'. On the right, the 'Audio Configuration' step is active. It includes instructions to review best practices for speech data optimization. Under 'Choose an audio file', the 'Local upload' option is selected. A highlighted red box surrounds the 'Audio file *' input field, which is described as accepting local audio files up to 10 MB. Below it, the 'Encoding type' dropdown is also highlighted. The 'Sample rate (Hertz)' input field is also highlighted. At the bottom, there are sections for 'Channel count' and 'Enable separate recognition per channel', both of which have their respective checkboxes checked.

Cloud Speech-to-Text API

2. 建立轉錄工作 c. 設定音檔

檔案限制 : .aac .flac .m4a .mogg .mp3 .mp4 .oga
.ogg .opus .raw .wav .wma

編碼限制 : AMR AMR_WB ENCODING_UNSPECIFIED
FLAC LINEAR16 MP3 MULAW OGG_OPUS
SPEEX_WITH_HEADER_BYTE WEBM_OPUS

取樣率 : 8000Hz ~ 48000Hz

The screenshot shows the 'New Transcription' setup in the Google Cloud Platform. The left sidebar has 'Speech-to-Text' selected under '語音轉錄'. The main area shows 'Audio Configuration' selected. It includes instructions to review best practices for speech data optimization. A file 'todayweather (online-audio-converter.com).mp3' is selected for upload via 'Local upload'. The 'Encoding type' dropdown is set to 'MP3'. The 'Sample rate (Hz)' input field contains '44100'. The 'Channel count' input field is empty. At the bottom, there's a progress bar showing '上傳和「enai」作業' and a checkbox for 'Enable separate recognition per channel'.

向下捲

Cloud Speech-to-Text API

2. 建立轉錄工作 c. 設定音檔

The screenshot shows the Google Cloud Platform interface for setting up a transcription job. The left sidebar has 'Speech-to-Text' selected under '語音轉錄'. The main area is titled 'Audio Configuration' with three steps: 1. Audio Configuration (selected), 2. Transcription options, 3. Model adaptation. Step 1 is currently active. The 'Audio' section contains instructions to review best practices before importing an audio file. It offers two upload options: 'Cloud Storage' (radio button) and 'Local upload' (radio button, selected). A file input field shows 'todayweather (online-audio-converter.com).mp3' with a 'Browse' button. The 'Encoding type' section shows 'MP3' selected from a dropdown. The '取樣率' (Sampling rate) section requires a value between 8000 and 48000 Hz, with '44100' entered. The 'Channel count' section notes that multiple channels affect pricing and allows entering a value, with 'Channel count' empty. The 'Enable separate recognition per channel' checkbox is checked. At the bottom right, there's a progress bar showing '上傳和「enai」作業' (Upload and 'enai' task) with a green checkmark and the file name 'todayweather (online-audio-converter.com).mp3', and a '完成' (Finish) button.

Cloud Speech-to-Text API

2. 建立轉錄工作 d. 設定語言

The screenshot shows the Google Cloud Platform interface for the Speech-to-Text API. The top navigation bar includes the Google Cloud Platform logo, user account information (enai), a search bar with the term "speech", and various navigation icons. The main title is "New Transcription". On the left, there's a sidebar with "Speech-to-Text" selected, showing three tabs: "總覽", "語音轉錄" (which is highlighted in blue), and "模型調整". The main content area is titled "Transcription options". It contains several sections: "Audio Configuration" (with a checked checkbox), "Transcription options" (which is also highlighted in blue), and "Model adaptation". Below these are two buttons: a blue "提交" (Submit) button and a white "取消" (Cancel) button. To the right of the "Transcription options" section, there's a note about advanced settings and supported configurations. Under "Spoken language", a dropdown menu is open, showing "Chinese, Mandarin (Traditional, Taiwan) - zh-TW", which is also highlighted with a pink rectangle. Further down, under "Transcription model", there's a note about choosing a language first and a dropdown menu set to "Default". At the bottom, there's a "繼續" (Continue) button.

Cloud Speech-to-Text API

3. 查看結果

The screenshot shows the Google Cloud Platform interface for the Speech-to-Text API. The top navigation bar includes the Google Cloud logo, user account information (enai), a search bar, and various navigation icons. The main header reads "Speech-to-Text" and "Transcriptions". A "NEW TRANSCRIPTION" button is visible.

The left sidebar has three options: "總覽" (Overview), which is selected and highlighted in blue; "語音轉錄" (Speech-to-Text), which is also a link; and "模型調整" (Model Tuning). The main content area displays a list of transcriptions. A message at the top says, "Your transcriptions are listed below. You can switch workspaces to find other transcriptions that are stored in a different workspace." Below this, a dropdown menu shows "工作區" set to "enaiworld".

A search bar labeled "輸入屬性名稱或值" is present. The table lists one transcription entry:

名稱	狀態	Audio file	Encoding	取樣率	Channels	語言	模型	Model adaptation	開始時間
todayweather (online-audio-conver...	成功	gs://enaiworld/audi...	MP3	44,100	2	zh-TW	default	-	2021/11/14

Cloud Speech-to-Text API

3. 查看結果

The screenshot shows the Google Cloud Platform interface for the Speech-to-Text service. The top navigation bar includes the Google Cloud logo, user account (enai), search bar ('搜尋產品和資源'), and various icons for notifications and account management. The main title is 'Transcription details' under the 'Speech-to-Text' project. On the left sidebar, 'Transcription details' is selected. The main content area is divided into three sections: '設定' (Settings), 'Transcription options', and 'Model adaptations'. The '設定' section displays audio file information: Audio file (View file), Encoding (MP3), Sample rate (hz) (44100), Channel count (2), Transcript (View file), and Billed audio minutes (0.25). The 'Transcription options' section shows language code (zh-TW) and transcription model (default). The 'Model adaptations' section indicates 'No information to show.' Below these sections is a timeline labeled '轉錄' (Transcription) showing a single entry from 00:00 to 00:02 with a confidence score of 0.93 and transcript '今天天氣很好'. At the bottom, there are playback controls (rewind, play, fast forward), a progress bar (00:00 / 00:03), and the file name 'todayweather (online-audio-converter.com).mp3'.

Service Account

服務帳戶概念

- Service Account 目的在於提供外部應用帳號並綁定必要 GCP API 權限
- 任意機器存取 GCP 服務 (如 GCS) ，需先建立 service account 搭配適當權限，並產生對應之金鑰 (in JSON) 後下載，於叫用服務 API 時搭配金鑰使用；此金鑰即代表該應用合法存取 GCP 服務之密碼

```
client = storage.Client.from_service_account_json(YOUR_SERVICE)
```

- 若應用位於 GCE 或為其他 PaaS 形式 (如 Cloud Run) ，可於 console 將 GCE 綁定 service account 即可不需金鑰 (強制使用金鑰仍然可行)

```
client = storage.Client()
```

- 存取 GCP API 僅初始化 client 繩金鑰的動作可能不同，後續操作皆相同

Service Account

1. 建立服務帳戶
2. 下載金鑰
3. 修正權限

Service Account

1. 建立服務帳戶

The screenshot shows the Google Cloud Platform (GCP) interface for managing Service Accounts under the IAM section. A pink box highlights the 'Service Accounts' option in the dropdown menu. The main panel displays a chart titled 'API API' showing 'Request (每秒要求數)' (Requests per second) over time, with a note stating 'No data is available for the selected time frame.' Below the chart is a link to '前往 API 總覽' (Go to API Catalog). To the right, there are sections for 'Google Cloud Platform 服務狀態' (Service Status), 'Monitoring', 'API Error Reporting', and '新聞' (News). The left sidebar lists various GCP services like Marketplace, API and Services, IAM and Management, Compute Engine, and Kubernetes Engine.

Service Account

1. 建立服務帳戶

The screenshot shows the Google Cloud Platform (GCP) IAM & Admin interface. The left sidebar is titled 'IAM 與管理' and includes options like IAM, Identity-Aware Proxy, and Service Accounts. The 'Service Accounts' option is selected and highlighted in blue. The main content area is titled '「enai」專案的服務帳戶' and contains a sub-section about service accounts. A prominent pink rectangular box highlights the '+ 建立服務帳戶' (Create Service Account) button. Below this, there's a search bar and a table header with columns: 電子郵件 (Email), 狀態 (Status), 名稱 (Name), 說明 (Description), 金鑰 ID (Key ID), 金鑰建立日期 (Key Creation Date), OAuth 2 用戶端 ID (OAuth 2 Client ID), and 動作 (Actions). A message at the bottom states '沒有可顯示的列' (No items to display).

Service Account

1. 建立服務帳戶

The screenshot shows the Google Cloud Platform (GCP) IAM & Admin interface. The left sidebar is titled 'IAM 與管理' and includes options like IAM, Identity-Aware Proxy, and Service Accounts. The 'Service Accounts' option is selected and highlighted in blue. The main area is titled '建立服務帳戶' (Create Service Account). Step 1, '服務帳戶詳細資料' (Service Account Details), is active. It shows the display name 'gcpai' and the service account ID 'gcpai-147 @enai-332100.iam.gserviceaccount.com'. A large red box highlights the 'gcpai' input field. Step 2, '將專案存取權授予這個服務帳戶 (選用)' (Grant project access to this service account (optional)), and Step 3, '將這個服務帳戶的存取權授予使用者 (選用)' (Grant user access to this service account (optional)), are shown below. At the bottom, there are '完成' (Finish) and '取消' (Cancel) buttons.

Service Account

1. 建立服務帳戶

The screenshot shows the Google Cloud Platform (GCP) IAM & Admin interface. The left sidebar is titled 'IAM 與管理' and includes options like IAM, Identity-Aware Proxy, and Service Accounts. The 'Service Accounts' option is selected and highlighted in blue. The main pane is titled '建立服務帳戶' (Create Service Account). It displays three steps:

- 服務帳戶詳細資料** (Service Account Details): A dropdown menu is open under '角色' (Role), showing '儲存空間物件管理員' (Storage Object Admin) selected. Other options include 'GCS 物件的完整控制權' (Full control over GCS objects) and '+ 新增其他角色' (Add other roles). A '條件' (Conditions) link is also present.
- 將專案存取權授予這個服務帳戶 (選用)** (Grant project access to this service account (Optional)): A note states: '將『enai』存取權授予這個服務帳戶，讓服務帳戶有權限對專案中的資源完成特定動作。' (Grant project access to this service account, allowing the service account to perform specific actions on resources within the project.)
- 將這個服務帳戶的存取權授予使用者 (選用)** (Grant user access to this service account (Optional))

At the bottom, there are '完成' (Finish) and '取消' (Cancel) buttons.

Service Account

1. 建立服務帳戶

Note

事後增加服務帳戶
權限要從
IAM 與管理 > IAM >
新增 或 編輯主體
進行

參閱

The screenshot shows the Google Cloud Platform IAM & Admin interface. The left sidebar is titled 'IAM 與管理' and includes options like IAM, Identity-Aware Proxy, and Roles. The main area is titled '服務帳戶' and shows a table of service accounts. One account is listed: 'gcpai-147@enai-332100.iam.gserviceaccount.com' with status '啟用' (Enabled), name 'gcpai', and a note '沒有任何金鑰' (No keys). A 'Actions' column contains a three-dot menu icon.

電子郵件	狀態	名稱	說明	金鑰 ID	金鑰建立日期	OAuth 2 用戶端 ID	動作
gcpai-147@enai-332100.iam.gserviceaccount.com	啟用	gcpai	沒有任何金鑰		109890291657135558290		⋮

Service Account

2. 下載金鑰

The screenshot shows the Google Cloud Platform (GCP) IAM & Admin interface. The left sidebar is titled 'IAM 與管理' and includes links for IAM, Identity-Aware Proxy, Roles, Audit Logs, Asset Inventory, Resource Management, and Version History. The 'Service Accounts' link is currently selected. The main content area is titled 'enai 專案的服務帳戶' and displays a table of service accounts. One account is listed: 'gcpai-147@enai-332100.iam.gserviceaccount.com' (Status: Green checkmark, Name: gcpai, Description: 沒有任何金鑰, Created: 109890291657135558290). A pink box highlights the '管理金鑰' (Manage Keys) option in the actions menu for this account. The bottom of the screen shows the URL: <https://console.cloud.google.com/iam-admin/serviceaccounts/details/109890291657135558290/keys?authuser=8&project=enai-332100>.

電子郵件	狀態	名稱	說明	金鑰 ID	金鑰建立日期	OAuth 2 用戶端 ID	動作
gcpai-147@enai-332100.iam.gserviceaccount.com	Green checkmark	gcpai	沒有任何金鑰		109890291657135558290		管理金鑰

Service Account

2. 下載金鑰

The screenshot shows the Google Cloud Platform (GCP) IAM & Admin interface. The left sidebar is titled 'IAM 與管理' and includes options like IAM, Identity-Aware Proxy, and Service Accounts. The 'Service Accounts' option is highlighted. The main area shows a table with one row under the heading '金鑰'. A warning message at the top right states: '如果服務帳戶的金鑰遭到盜用，可能會產生安全性風險。建議您不要下載服務帳戶金鑰，並改用 [Workload Identity 聯盟](#)。如要進一步瞭解在 Google Cloud 中驗證服務帳戶的最佳做法，請按 [這裡](#)。' Below the warning, there's a note about adding a key group or uploading a public key from an existing group. A button labeled '新增金鑰' is highlighted with a pink box. The table has columns for Type, Status, Key, Creation Date, and Expiry Date, with a note '沒有可顯示的列'.

Service Account

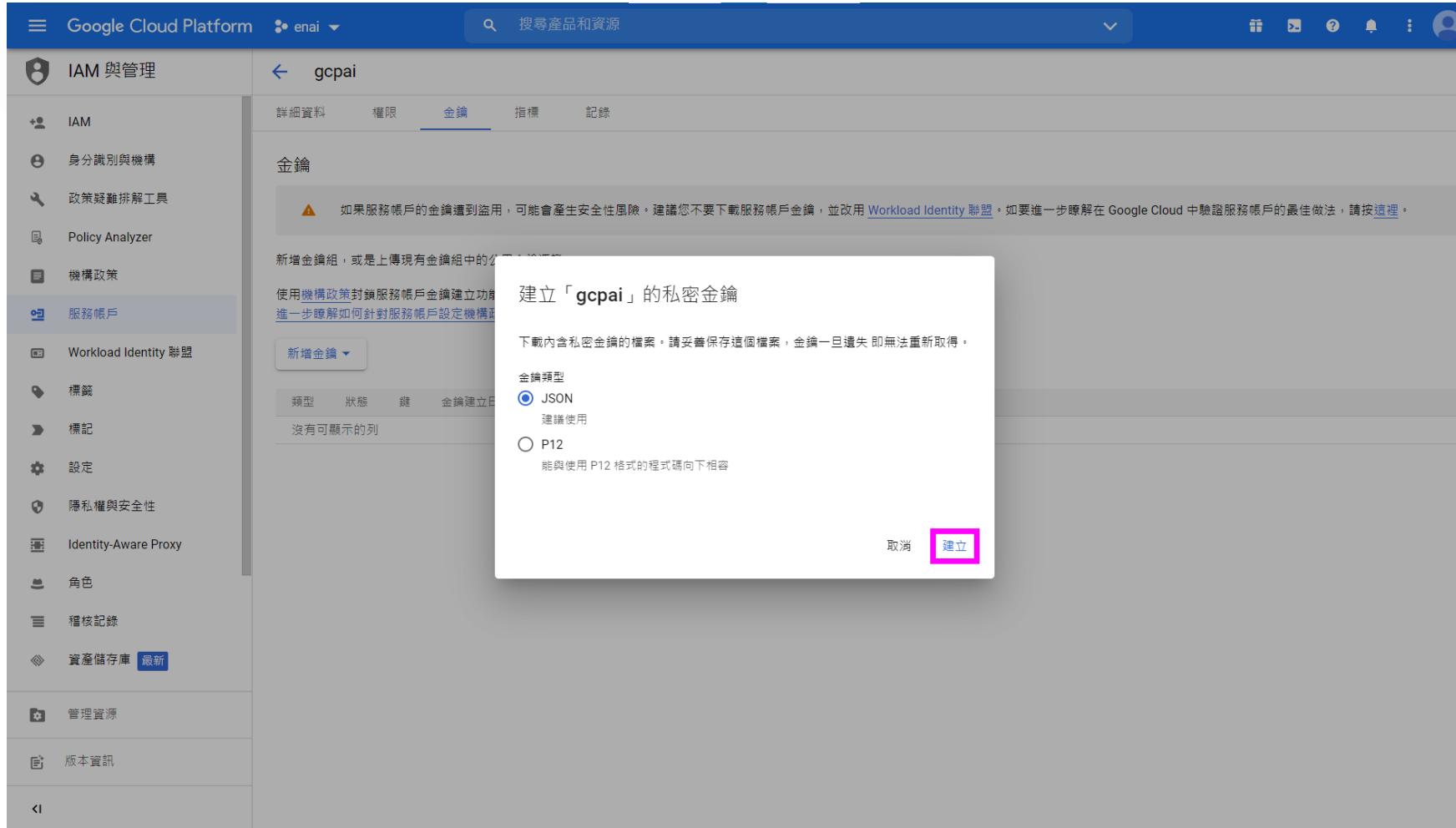
2. 下載金鑰

The screenshot shows the Google Cloud Platform (GCP) IAM & Admin interface. The left sidebar is titled 'IAM 與管理' and includes options like IAM, Identity-Aware Proxy, and Service Accounts. The 'Service Accounts' option is currently selected. The main area is titled 'gcpai' and shows the 'Keys' tab. A warning message at the top states: '如果服務帳戶的金鑰遭到盜用，可能會產生安全性風險。建議您不要下載服務帳戶金鑰，並改用 [Workload Identity 聯盟](#)。如要進一步瞭解在 Google Cloud 中驗證服務帳戶的最佳做法，請按 [這裡](#)。' Below this, there's a note about adding new keys or uploading existing ones. A button labeled '建立新的金鑰' is highlighted with a red box. The table below has columns for Key, Key creation date, and Key expiration date.

建立新的金鑰	金鑰建立日期	金鑰到期日
上傳現有金鑰		

Service Account

2. 下載金鑰



Service Account

2. 下載金鑰

The screenshot shows the Google Cloud Platform (GCP) interface for managing Service Accounts. The left sidebar navigation includes 'IAM 與管理' (IAM & Management), 'IAM', '身分識別與機構' (Identity & Organizations), '政策疑難排解工具' (Policy Troubleshooter), 'Policy Analyzer', '機構政策' (Organization Policy), '服務帳戶' (Service Accounts), 'Workload Identity 聯盟' (Workload Identity Federation), '標籤' (Tags), '標記' (Annotations), '設定' (Settings), '隱私權與安全性' (Privacy & Security), 'Identity-Aware Proxy', '角色' (Roles), '稽核記錄' (Audit Logs), '資產儲存庫' (Assets Library), '最新' (Latest), '管理資源' (Manage Resources), and '版本資訊' (Version History). The main content area is titled 'gcpai' and shows the '金鑰' (Key) tab selected. A warning message states: '如果服務帳戶的金鑰遭到盜用，可能會產生安全性風險。建議您不要下載服務帳戶金鑰，並改用 [Workload Identity 聯盟](#)。如要進一步瞭解在 Google Cloud 中驗證服務帳戶的最佳做法，請按 [這裡](#)。' Below this, it says: '新增金鑰組，或是上傳現有金鑰組中的公用金鑰憑證。' and '使用 [機構政策](#) 封鎖服務帳戶金鑰建立功能。' A button labeled '新增金鑰' (Add Key) is visible. A modal window in the foreground displays the message: '已將私密金鑰儲存至您的電腦中' (The private key has been saved to your computer) and contains a warning: '「enai-332100-667fc564939e.json」可用來存取您的雲端資源，因此請妥善保管。' (The file 'enai-332100-667fc564939e.json' can be used to access your cloud resources, so please keep it safe.) with a '了解詳情' (Learn more) link. The modal has a '關閉' (Close) button highlighted with a pink rectangle. In the bottom left corner, there is a '使用者' (User) section showing 'Downloads' with a file named 'enai-332100-667fc564939e.json'.

Speech-to-Text Application

服務叫用

- a. 初始化
- b. 準備音檔
- c. 叫用 GCS API 上傳音檔
- d. 叫用 Speech-to-Text API 語音轉文字
- e. 處理結果

Speech-to-Text Application

服務叫用

a. 初始化

套件 Google Cloud Speech, Google Cloud Storage

```
pip install google-cloud-speech google-cloud-storage --upgrade
```

Speech-to-Text Application

服務叫用

a. 初始化

程式指定服務帳戶金鑰 in JSON

```
from google.cloud import speech, storage
```

```
YOUR_SERVICE = 'YOUR_SERVICE'
```

```
YOUR_AUDIO = 'YOUR_AUDIO'
```

```
YOUR_BUCKET = 'YOUR_BUCKET'
```

```
storage_client = storage.Client.from_service_account_json(YOUR_SERVICE)
```

```
speech_client = speech.SpeechClient.from_service_account_json(YOUR_SERVICE)
```

Speech-to-Text Application

服務叫用

a. 初始化

環境變數指定服務帳戶金鑰 in JSON

```
import os
from google.cloud import speech, storage

YOUR_SERVICE = 'YOUR_SERVICE'
YOUR_AUDIO = 'YOUR_AUDIO'
YOUR_BUCKET = 'YOUR_BUCKET'
os.environ['GOOGLE_APPLICATION_CREDENTIALS'] = YOUR_SERVICE
storage_client = storage.Client()
speech_client = speech.SpeechClient()
```

Speech-to-Text Application

服務叫用

a. 初始化

服務運行於 GCP (如 GCE、Cloud Run)，直接於 GCP 指定服務帳戶

```
from google.cloud import speech, storage
```

```
YOUR_AUDIO = 'YOUR_AUDIO'
```

```
YOUR_BUCKET = 'YOUR_BUCKET'
```

```
storage_client = storage.Client()
```

```
speech_client = speech.SpeechClient()
```



Speech-to-Text Application

服務叫用

b. 準備音檔

手動產生：同前

預先產生：略

即時產生：稍候

Speech-to-Text Application

服務叫用

c. 叫用 GCS API 上傳音檔

```
# upload file to GCS(Google Cloud Storage)
bucket = storage_client.bucket(YOUR_BUCKET)
bucket.blob(YOUR_AUDIO).upload_from_filename(YOUR_AUDIO)
uri = f'gs://{{YOUR_BUCKET}}/{{YOUR_AUDIO}}'
```

Speech-to-Text Application

服務叫用

d. 叫用 Speech-to-Text API 語音轉文字

```
# Transcript the audio
audio = speech.RecognitionAudio(uri=uri)
config = speech.RecognitionConfig(
    encoding=speech.RecognitionConfig.AudioEncoding.FLAC, # MP3 is under beta
    sample_rate_hertz=48000,
    audio_channel_count=2, # take care, default is 1
    language_code="zh-TW"
)
response = speech_client.recognize(config=config, audio=audio)
```

Speech-to-Text Application

服務叫用

e. 處理結果

```
for r in response.results:  
    print(f'{r.alternatives[0].transcript}, {r.alternatives[0].confidence:.3f}')
```

Service Account

3. 修正權限

a. 服務帳戶權限異動

點擊 編輯主體 以編輯權限

The screenshot shows the Google Cloud Platform IAM & Admin interface. The left sidebar has 'IAM' selected. The main area shows the 'enai' project's IAM policy. There are two entries:

成員	名稱	角色	操作
catchoctopus@gmail.com	Enos Chou	擁有者	
gcpal-438@enai-323212.iam.gserviceaccount.com	gcpal	儲存空間物件管理員	

Service Account

3. 修正權限

a. 服務帳戶權限異動

修正角色並儲存

The screenshot shows the Google Cloud Platform IAM interface. On the left, a sidebar lists various IAM-related options like IAM, Policy Analyzer, and Roles. The main panel displays the 'enai' project's IAM permissions. It shows a member named 'gcpal-438@enai-323212.iam.gserviceaccount.com' assigned the 'Storage Object Admin' role, which grants 'GCS objects' full control. A 'Save' button is visible at the bottom right of the modal.

編輯權限

成員 專案

gcpal-438@enai-323212.iam.gserviceaccount.com enai

角色 條件

儲存空間物件管理員 新增條件

GCS 物件的完整控制權，

+ 新增其他角色

儲存 取消

「enai」專案的權限
這些權限會影響這項專案及其所有資源。[瞭解詳情](#)

檢視方式： 成員 角色

輸入屬性名稱或值

類型 成員 ↑

人物 catchoctopus@gmail.com

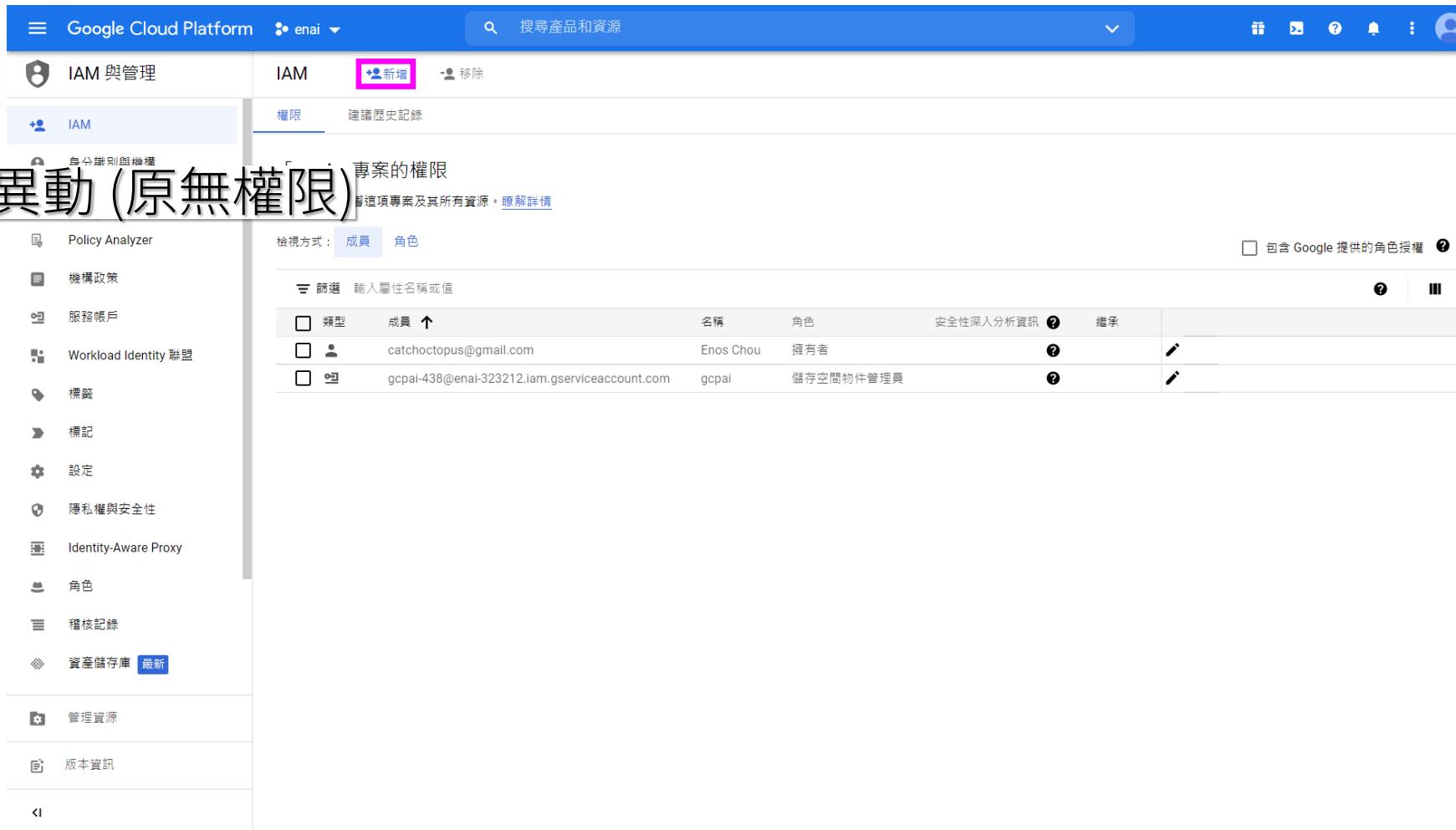
帳戶 gcpal-438@enai-323212.iam.gserviceaccount.com

Service Account

3. 修正權限

b. 服務帳戶權限異動 (原無權限)

點擊 新增



The screenshot shows the Google Cloud Platform IAM & Admin interface. The left sidebar is titled 'IAM 與管理' and includes options like 'Policy Analyzer', '機構政策', '服務帳戶', 'Workload Identity 聯盟', '標籤', '標記', '設定', '隱私權與安全性', 'Identity-Aware Proxy', '角色', '稽核記錄', '資產儲存庫', '管理資源', and '版本資訊'. The main content area is titled '專案的權限' and shows a table of members and their roles. A search bar at the top right says '搜尋產品和資源'. The '新增' (Add) button in the top navigation bar is highlighted with a pink box.

類型	成員	名稱	角色	安全性深入分析資訊	繼承	編輯
<input type="checkbox"/>		catchoctopus@gmail.com	Enos Chou	擁有者		
<input type="checkbox"/>		gcpai-438@enai-323212.iam.gserviceaccount.com	gcpai	儲存空間物件管理員		

Service Account

3. 修正權限

b. 服務帳戶權限異動 (原無權限)

新增成員與角色後儲存

The screenshot shows the Google Cloud Platform IAM interface. On the left, a sidebar lists various IAM-related services: Workload Identity 聯盟, 標籤, 標記, 設定, 隱私權與安全性, Identity-Aware Proxy, 角色, 稽核記錄, 資產儲存庫 (最新), 管理資源, and 版本資訊. The 'IAM' service is selected.

The main panel displays the 'IAM' section under '權限'. It includes a search bar, a '新增' (Add) button, and a '移除' (Delete) button. Below these are tabs for '權限' (Permissions) and '建議歷史記錄' (Suggested History Log). A note at the top right says: '將成員新增至「enai」專案' (Add member to 'enai' project) and '將成員和角色新增至「enai」專案' (Add member and role to 'enai' project).

A large input field is highlighted with a pink border, intended for entering member email addresses. To its right is a dropdown menu labeled '請選擇角色' (Select role) also highlighted with a pink border. Below these are buttons for '條件' (Conditions) and '新增條件' (Add condition). At the bottom are '儲存' (Save) and '取消' (Cancel) buttons.

Service Account

3. 修正權限

b. 服務帳戶權限異動 (原無權限)

新增成員與角色後儲存

The screenshot shows the Google Cloud Platform IAM & Management interface. On the left sidebar, 'IAM' is selected under 'IAM 與管理'. The main panel shows the 'IAM' section with the '權限' tab active. A search bar at the top right contains the text 'enai'. Below it, there's a note about viewing the policy for the '專案的權限' (Project's permissions) and a link to '瞭解詳情' (Learn more). The '檢視方式' dropdown is set to '成員'. A search input field says '輸入屬性名稱或值' (Input attribute name or value). A table lists three members:

類型	成員
<input type="checkbox"/>	catchoctopus@gmail.com
<input type="checkbox"/>	gcpal-438@enai-323212.iam.gserviceaccount.com

To the right, a note says '將成員新增至『enai』' (Add member to 'enai'). It shows a list of members with one highlighted: 'gcpaltest@enai-323212.iam.gserviceaccount.com'. Below this, a dropdown menu is set to '儲存空間物件管理員' (Storage object administrator). A note says 'GCS 物件的完全控制權' (Full control over GCS objects). At the bottom right are '條件' (Conditions) and '新增條件' (Add condition) buttons, and two buttons at the bottom: '儲存' (Save) and '取消' (Cancel).

Service Account

3. 修正權限

c. 生效時間 > 1 分

The screenshot shows the Google Cloud Platform IAM & Admin interface. The left sidebar is titled 'IAM 與管理' and includes options like '身分識別與機構', '政策疑難排解工具', 'Policy Analyzer', '機構政策', '服務帳戶', 'Workload Identity 聯盟', '標籤', '標記', '設定', '隱私權與安全性', 'Identity-Aware Proxy', '角色', '稽核記錄', '資產儲存庫', '管理資源', and '版本資訊'. The main content area is titled 'enai 專案的權限' and shows a table of members and their roles. The table has columns for '類型', '成員', '名稱', '角色', '安全性深入分析資訊', and '繼承'. It lists three entries:

類型	成員	名稱	角色	安全性深入分析資訊	繼承
人	catchoctopus@gmail.com	Enos Chou	擁有者	?	笔
服務帳戶	gcpai-438@enai-323212.iam.gserviceaccount.com	gcpai	儲存空間物件管理員	?	笔
服務帳戶	gcpaitest@enai-323212.iam.gserviceaccount.com	gcpaitest	儲存空間物件管理員	?	笔

Speech-to-Text Application

服務叫用

- b. 準備音檔 (即時產生)

套件 PyAudio

```
pip install pyaudio
```

Speech-to-Text Application

服務叫用

- b. 準備音檔 (即時產生)

套件 PyAudio

error

root cause

PyAudio 僅支援至 Python 3.6

solution

搜尋應進入 Unofficial Windows Binaries for Python Extension Packages > pyaudio > 下載對應 Python 版本之 .whl > 以 pip 安裝

Speech-to-Text Application

服務叫用

b. 準備音檔 (即時產生)

```
import pyaudio
import wave

CHUNK = 1024
FORMAT = pyaudio.paInt16
CHANNELS = 2
RATE = 44100
RECORD_SECONDS = 5
WAVE_OUTPUT_FILENAME = "output.wav"
```

```
p = pyaudio.PyAudio()

stream = p.open(format=FORMAT,
                 channels=CHANNELS,
                 rate=RATE,
                 input=True,
                 frames_per_buffer=CHUNK)

print("* recording")
```

Speech-to-Text Application

服務叫用

b. 準備音檔 (即時產生)

```
frames = []
for i in range(0, int(RATE / CHUNK * RECORD_SECONDS)):
    data = stream.read(CHUNK)
    frames.append(data)

print("* done recording")
```

```
stream.stop_stream()
stream.close()
p.terminate()
```

```
wf = wave.open(WAVE_OUTPUT_FILENAME, 'wb')
wf.setnchannels(CHANNELS)
wf.setsampwidth(p.get_sample_size(FORMAT))
wf.setframerate(RATE)
wf.writeframes(b''.join(frames))
wf.close()
```

Your Turn - Realtime Speech Recognition

即時讀取用戶語音，轉換為文字 (45 mins)

1. 固定語音秒數

Your Turn - Realtime Speech Recognition

即時讀取用戶語音，轉換為文字 (45 mins)

2. 任意語音秒數 (optional)

Hint

threading

Vision API

Cloud Vision API
Vision Application

Cloud Vision API

先試試

<https://cloud.google.com/vision>

Google Cloud 選用 Google 的理由 解決方案 產品 定價 開始使用 搜尋 联繫我們 中文 - 繁體 控制台 E

Cloud Vision API

深入瞭解新的 AI 和機器學習功能，讓您制定更明智的決策。[報名參加 2021 年 Next 大會。](#)

Vision AI

優點
示範

主要功能與特色
客戶
最新資訊
說明文件
用途

Vision Product Search
文件分類
圖片搜尋

所有功能與特色
定價
後續行動

透過 AutoML Vision 從雲端或邊緣裝置的圖片中發掘深入分析結果，或使用預先訓練的 Vision API 模型偵測情緒、理解文字，或執行其他作業。

[前往主控台](#)

- ✓ 採用機器學習技術，以領先業界的預測準確率助您解讀圖片內容
- ✓ 使用 AutoML Vision 訓練機器學習模型，依據自訂標籤將圖片分類
- ✓ 使用 Vision API 偵測物件與臉孔、讀取手寫文字，以及建構具有參考價值的圖片中繼資料

優點

自動偵測物件 偵測多個物件並進行分類，包括每個物件在圖片中的位置。進一步瞭解 Vision API 和 AutoML	享有邊緣智慧功能 使用 AutoML Vision Edge 建構並部署快速、高準確率的模型，以便在邊緣分類圖片或偵測物件，	減少購買流程中的阻礙 透過 Vision API 的 Vision Product Search 功能，零售商可以打造引人入勝的行動體驗，在
------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------


影片
AES 是名列《財富》雜誌全球前 500 大企業的電力公司，他們採用 AutoML Vision 積極推動綠色能源
02:30

Cloud Vision API

先試試

Google Cloud 選用 Google 的理由 解決方案 產品 定價 開始使用 搜尋 索引 文件 支援 中文 - 繁體 ▾ 控制台 聯絡我們 E

Cloud Vision API

Vision AI

優點

示範

主要功能與特色

客戶

最新資訊

說明文件

用途

Vision Product Search

主要功能與特色

文件分類

圖片搜尋

所有功能與特色

定價

後續行動

試用 API

示範

Try the API

Drag image file here or
Browse from your computer

提供兩款電腦視覺產品幫助您解讀圖片內容

AutoML Vision

本產品可自動執行自訂機器學習模型的訓練作業。您只需要進行以下操作：透過 [AutoML Vision](#) 簡單易用的圖形介面上傳圖片並訓練自訂圖片模型；針對準確率、延遲時間及規模大小，進行模型最佳化；將模型匯出到雲端應用程式或一組邊緣裝置。

Vision API

新聞

Gartner 2021 年《Cloud AI 開發人員服務 Magic Quadrant》報告

Gartner

Cloud Vision API

先試試

Google Cloud 選用 Google 的理由 解決方案 產品 定價 開始使用 搜尋 索引 文件 支援 中文 - 繁體 ▾ 控制台 聯絡我們

Vision AI

- 優點
- 示範**
- 主要功能與特色
- 客戶
- 最新資訊

試用 API

Try the API

Faces Objects Labels Properties Safe Search



Joy	Very Unlikely
Surprise	Very Unlikely
Anger	Very Unlikely
Blurred	Very Unlikely
Exposed	Very Unlikely
Headwear	Very Unlikely
Roll: -7°	Tilt: 1° Pan: -1°

Confidence 89%

Cloud Vision API

價格

<https://cloud.google.com/vision> > 定價

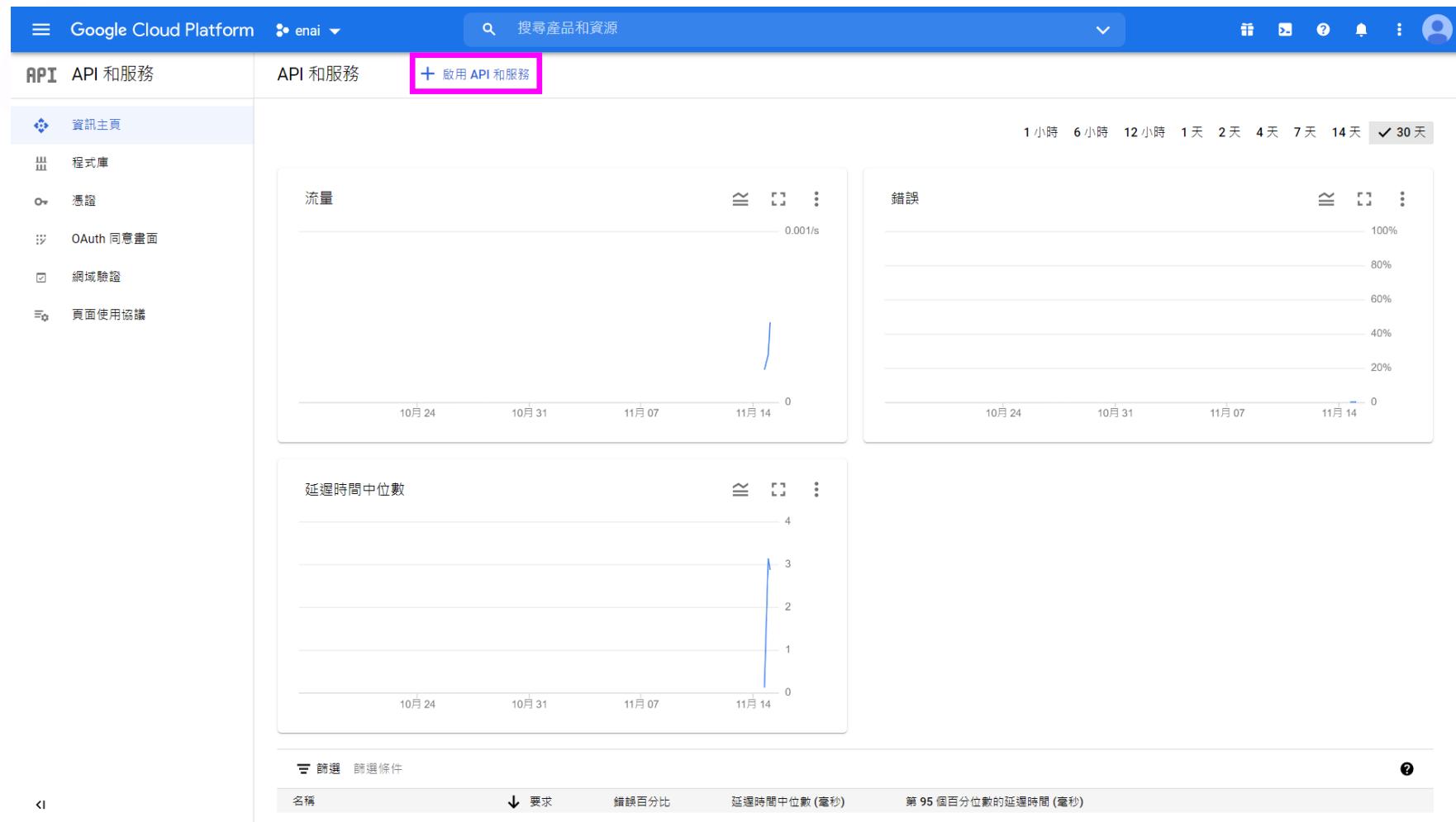
Cloud Vision API

Console 無法
直接使用

The screenshot shows the Google Cloud Platform (GCP) interface for the Vision service. The left sidebar has a 'Vision' section with three items: '資訊主頁' (selected), '資料集', and '模型'. The main content area is titled 'AutoML Vision' and 'Vision API'. Under 'AutoML Vision', there are two sections: '圖片分類' (Image Classification) and '物件偵測' (Object Detection). Both sections have a '開始使用' (Get Started) button and a '瞭解詳情' (Learn More) link. Under 'Vision API', there are two sections: 'Vision API' and 'Vision 商品搜尋' (Vision Product Search). Both sections have a '查看說明文件' (View Documentation) button.

Cloud Vision API

啟用 API



The screenshot shows the Google Cloud Platform API Services page. The top navigation bar includes the Google Cloud Platform logo, user account information (enai), a search bar, and various navigation icons. The main menu is set to 'API 和服務'. A prominent blue button labeled '+ 啟用 API 和服務' (Enable API and service) is highlighted with a pink rectangular box. To the left, a sidebar lists several options under the '資訊主頁' heading: 程式庫, 憑證, OAuth 同意畫面, 網域驗證, and 頁面使用協議. The main content area displays three performance metrics over time (from October 24 to November 14): 1. '流量' (Traffic): Shows a value of 0.001/s. 2. '錯誤' (Errors): Shows a percentage of 100% (blue line at the top). 3. '延遲時間中位數' (Median Latency): Shows a value of 4 milliseconds. At the bottom, there is a '篩選' (Filter) section and a table header with columns: 名稱 (Name), 要求 (Requests), 錯誤百分比 (Error %), 延遲時間中位數 (毫秒) (Median Latency (ms)), and 第 95 個百分位數的延遲時間 (毫秒) (95th Percentile Latency (ms)).

Cloud Vision API

啟用 API

The screenshot shows the Google Cloud Platform API Library interface. The top navigation bar includes the Google Cloud Platform logo, a user account dropdown, and various icons for search, refresh, and notifications.

The main header reads "歡迎使用 API 程式庫" (Welcome to the API Library) with the sub-instruction "API 程式庫提供說明文件、連結和智慧搜尋功能。" (The API Library provides documentation, links, and intelligent search features.)

A search bar at the top right contains the placeholder "搜尋 API 和服務" (Search APIs and services).

On the left, there is a sidebar with a list of categories and their counts:

- 建置 (8)
- 客戶關係管理 (1)
- 資料庫 (6)
- 開發人員堆疊 (2)
- 開發人員工具 (18)
- 電子郵件 (1)
- Google Enterprise API (182)
- 金融服務 (1)
- Firebase (5)
- Google Workspace (18)
- 醫療照護 (4)
- 機器學習 (9)
- 地圖 (15)
- 行動 (12)
- 監控 (3)
- 網路 (7)
- 作業系統 (1)
- 安全性 (5)
- Security Command Center 服務 (1)

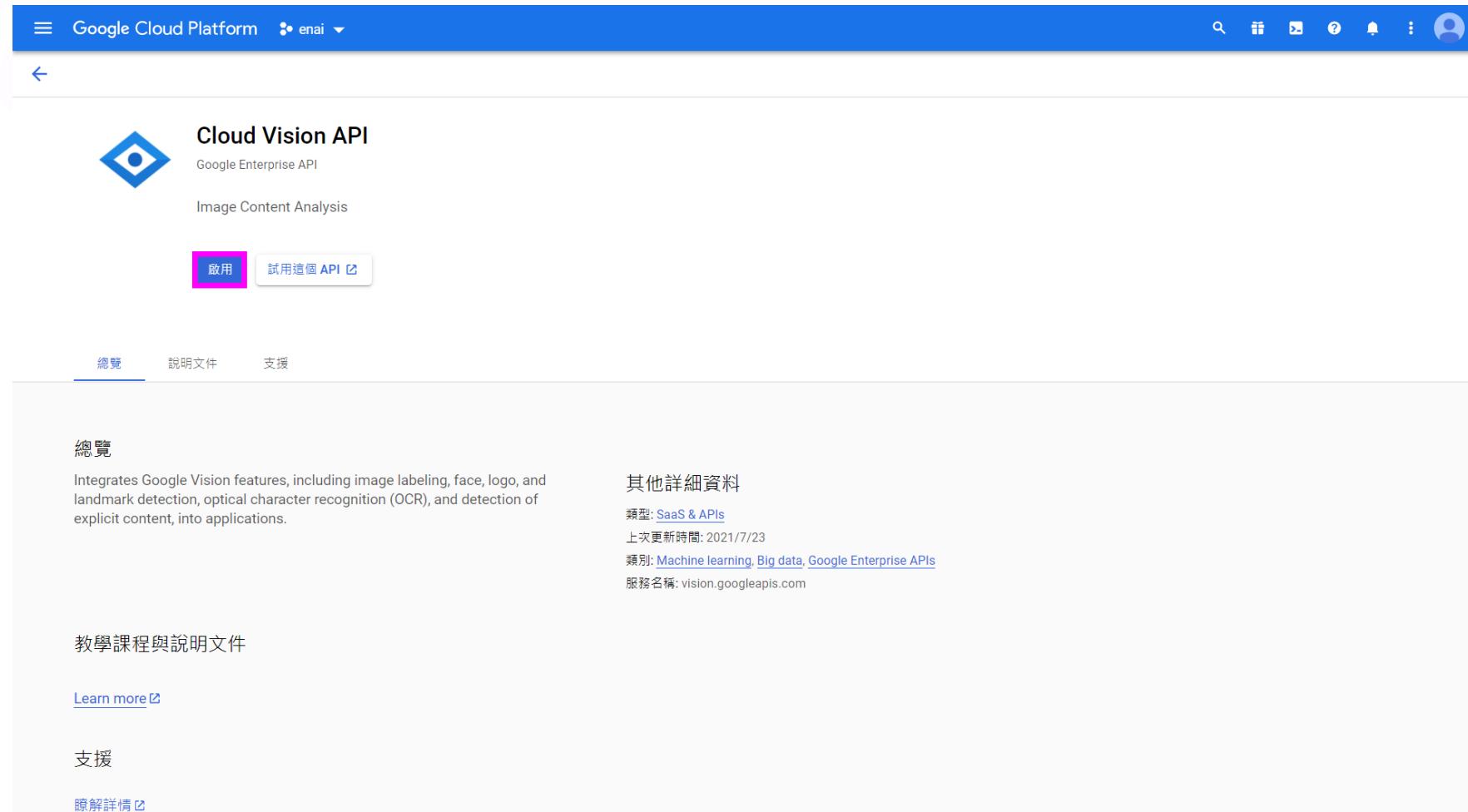
Below the sidebar, there are several service cards:

- Dialogflow API** (Google Enterprise API) - Builds conversational interfaces
- Cloud Vision API** (Google Enterprise API) - Image Content Analysis (This card is highlighted with a pink border)
- Cloud Natural Language API** (Google Enterprise API) - Provides natural language understanding technologies, such as sentiment analysis, entity...
- Cloud Speech-to-Text API** (Google Enterprise API) - Speech recognition

At the bottom, there are links to "Google Workspace" and "查看全部 (18 項)" (View all 18 items). The footer features icons for Google Drive, Google Sheets, Google Slides, Google Mail, and Google Keep.

Cloud Vision API

啟用 API



The screenshot shows the Google Cloud Platform interface for enabling the Cloud Vision API. The top navigation bar includes the Google Cloud Platform logo, a user dropdown, and various icons. The main content area features the Cloud Vision API logo (a blue eye icon) and its name. Below the logo, it says "Google Enterprise API" and "Image Content Analysis". A prominent blue "Enable" button is highlighted with a pink rectangle. To its right is a "Try this API" button. Below these buttons are three tabs: "Overview" (which is selected and underlined), "Documentation", and "Support". The "Overview" section contains a "Summary" card with the following text: "Integrates Google Vision features, including image labeling, face, logo, and landmark detection, optical character recognition (OCR), and detection of explicit content, into applications." To the right of this summary is a "More details" section with the following information: "Type: SaaS & APIs", "Last updated: 2021/7/23", "Category: Machine learning, Big data, Google Enterprise APIs", and "Service name: vision.googleapis.com". At the bottom of the page, there are links for "Teaching materials and documentation" (with a "Learn more" button) and "Support" (with a "View details" button).

Cloud Vision API

啟用 API

The screenshot shows the Google Cloud Platform interface for managing APIs. The top navigation bar includes the Google Cloud logo, user account (enai), a search bar ('搜尋產品和資源'), and various navigation icons.

The main content area is titled 'API 和服務' (API and Services) and specifically shows the 'Cloud Vision API'. On the left, there's a sidebar with tabs: '總覽' (Overview) which is selected, '指標' (Metrics), '配額' (Quotas), and '憑證' (Certificates).

The 'Overview' section contains the following details:

- 詳細資料**:
 - 名稱: Cloud Vision API
 - 建立者: Google Enterprise API
 - 服務名稱: vision.googleapis.com
 - 總覽: Integrates Google Vision features, including image labeling, face, logo, and landmark detection, optical character recognition (OCR), and detection of explicit content, into applications.
 - 啟用狀態: 已啟用
- 教學課程與說明文件**:
 - [Learn more](#)

To the right, there are two main charts:

- 依回應碼區別的流量**: A line chart showing requests per second over time. The Y-axis ranges from 0 to 1.0/s. The X-axis shows dates: 10月 24, 10月 31, 11月 07, and 11月 14. The chart displays a single data series with values: 1.0/s, 0.8/s, 0.6/s, 0.4/s, 0.2/s, and 0. A note at the bottom states: '⚠️ No data is available for the selected time frame.'
- 帳單**: Shows a message: '這個 API 在這段期間內沒有任何資料' (This API has no data in this period).

Cloud Vision API

`google.cloud.vision.ImageAnnotatorClient()` major methods

- `label_detection()`
- `face_detection()`
- `text_detection()`
- `document_text_detection()`
- `object_localization()`
- `landmark_detection()`
- `web_detection()`
- `logo_detection()`
- `safe_search_detection()`
- `product_search()`

Vision Application

服務叫用

- a. 初始话
- b. 準備圖檔
- c. 叫用 Vision API
- d. 處理結果

Vision Application

服務叫用

a. 初始话

套件 Google Cloud Vision, Matplotlib, Pillow

```
pip install google-cloud-vision matplotlib pillow --upgrade
```

Vision Application

服務叫用

a. 初始化

程式指定服務帳戶金鑰 in JSON

```
from google.cloud import vision
```

```
YOUR_SERVICE = 'YOUR_SERVICE'
```

```
client = vision.ImageAnnotatorClient.from_service_account_json(YOUR_SERVICE)
```

Vision Application

服務叫用

a. 初始化

環境變數指定服務帳戶金鑰 in JSON

```
import os
from google.cloud import vision

YOUR_SERVICE = 'YOUR_SERVICE'

os.environ['GOOGLE_APPLICATION_CREDENTIALS'] = YOUR_SERVICE
client = vision.ImageAnnotatorClient()
```

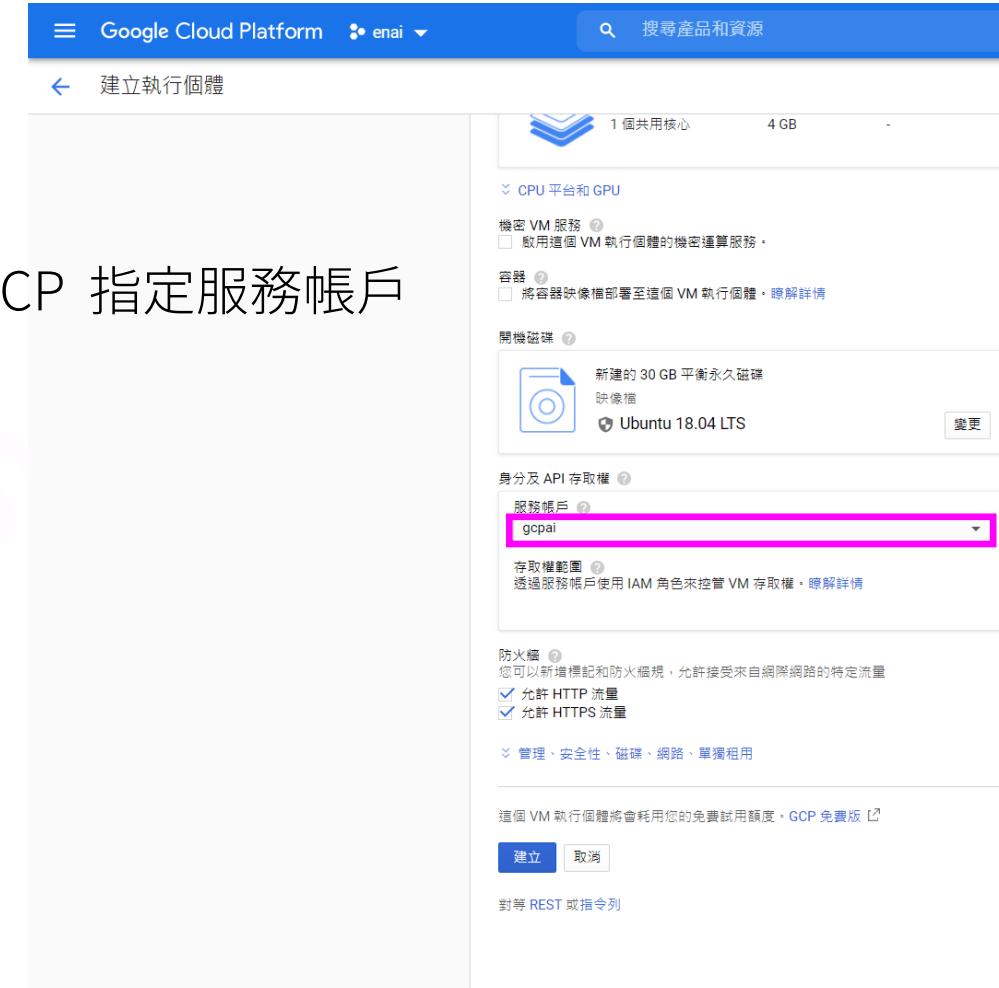
Vision Application

服務叫用

a. 初始化

服務運行於 GCP (如 GCE、Cloud Run)，直接於 GCP 指定服務帳戶

```
from google.cloud import vision  
  
client = vision.ImageAnnotatorClient()
```



Vision Application

服務叫用

b. 準備圖檔

one-shot upload

```
YOUR_PIC = 'YOUR_PIC'

with open(YOUR_PIC, 'rb') as image_file:
    content = image_file.read()
image = vision.Image(content=content)
```

Vision Application

服務叫用

b. 準備圖檔

through GCS

```
from google.cloud import storage  
  
YOUR_BUCKET = 'YOUR_BUCKET'  
YOUR_PIC = 'YOUR_PIC'
```

```
storage_client = storage.Client()  
bucket = storage_client.bucket(YOUR_BUCKET)  
bucket.blob(YOUR_PIC).upload_from_filename(YOUR_PIC)  
image_uri = f'gs://{{YOUR_BUCKET}}/{{YOUR_PIC}}'  
source = vision.ImageSource(image_uri=image_uri)  
image = vision.Image(source=source)
```

Vision Application

服務叫用

c. 叫用 Vision API

```
response = client.label_detection(image=image)
response = client.face_detection(image=image)
response = client.text_detection(image=image)
response = client.document_text_detection(image=image)
response = client.object_localization(image=image)
response = client.web_detection(image=image)
response = client.landmark_detection(image=image)
response = client.logo_detection(image=image)
response = client.safe_search_detection(image=image)
response = client.product_search(image=image)
```

Vision Application

服務叫用

d. 處理結果

`label_detection()`

- 物品種類

`face_detection()`

- 人臉座標
- 五官種類與位置
- 情緒
- 其他

Vision Application

服務叫用

d. 處理結果

`text_detection()`

- 文字位置與內容

`document_text_detection()`

- 文章位置與內容

Vision Application

服務叫用

d. 處理結果

`object_localization()`

- 物件位置與類別

`web_detection()`

- 爬網找物品
- 爬網找近似影像
- 紿予照片標籤

Vision Application

服務叫用

d. 處理結果

`landmark_detection()`

- 地標位置、類別、經緯度

`logo_detection()`

- 商標名稱與位置

Vision Application

服務叫用

d. 處理結果

`safe_search_detection()`

- 五種風險內容等級

`product_search()`

Your Turn - Car Plate Recognition

整合 Google Cloud Vision API，實作車牌辨識機制 (45 mins)



Call by GCE

Google Compute Engine

Call by GCE

以 VM 驗證 GCP AI

- a. 建立 VM
- b. 初始化 VM
- c. 叫用 GCP AI

Call by GCE

以 VM 驗證 GCP AI

a. 建立 VM

啟用 Compute Engine

The screenshot shows the GCP console interface. On the left, a sidebar menu lists various services: Marketplace, 帳單 (Billing), API 和服務 (API & Services), 支援 (Support), IAM 與管理 (IAM & Management), 開始使用 (Getting Started), 法規遵循 (Regulatory Compliance), 安全性 (Security), Anthos, 運算 (Compute), Compute Engine (highlighted with a pink box), Kubernetes Engine, and VMware Engine. The main content area displays a chart titled 'API API' showing '要求 (每秒要求數)' (Requests per second) over time from 3:30 to 4:15. A red dot indicates a peak of 0.093/s at approximately 4:05. To the right, there are sections for 'Google Cloud Platform 服務狀態' (Service Status), '計費功能' (Billing Features), 'Monitoring', and 'API Error Reporting'. The URL at the bottom is <https://console.cloud.google.com/compute/instances?project=enai-323212>.

Call by GCE

以 VM 驗證 GCP AI

a. 建立 VM

啟用 Compute Engine

The screenshot shows the Google Cloud Platform API library interface. At the top, there's a blue header bar with the text "Google Cloud Platform" and "enai". A search bar says "搜尋產品和資源". On the right side of the header are several icons: a gear, a square, a question mark, a bell, and a user profile.

The main content area displays the "Compute Engine API" page. It features a blue icon of a microchip and the text "Compute Engine API" and "Google Enterprise API". Below this, it says "Compute Engine API". There are two buttons: a blue "啟用" button and a white "試用這個 API" button with blue text.

Below the main title, there are three tabs: "總覽" (selected), "說明文件", and "支援".

The "總覽" section contains the following information:

- 總覽**: Describes the API as "Creates and runs virtual machines on Google Cloud Platform."
- 其他詳細資料**: Includes:
 - 類型: SaaS & APIs
 - 上次更新時間: 2021/7/23
 - 類別: Compute, Networking, Google Enterprise APIs
 - 服務名稱: compute.googleapis.com
- 教學課程與說明文件**: Contains a "Learn more" link.

The "支援" section contains the following links:

- 支援
- 瞭解詳情

Call by GCE

以 VM 驗證 GCP AI

a. 建立 VM

建立執行個體

The screenshot shows the Google Cloud Platform Compute Engine interface. On the left, a sidebar menu is open under 'Compute Engine' with 'VM 執行個體' selected. The main content area displays a table of existing VM instances. A prominent blue button labeled '建立執行個體' (Create VM) is highlighted with a pink rectangle. Below the table, there is a large graphic of a globe with colored dots (yellow, green, blue, red) and a small text box with the text 'VM 執行個體'. At the bottom of the page, there are two buttons: '建立執行個體' and '進入快速入門導覽課程'.

Call by GCE

以 VM 驗證 GCP AI

a. 建立 VM

建立執行個體

The screenshot shows the Google Cloud Platform (GCP) interface for creating a new VM instance. The top navigation bar includes 'Google Cloud Platform', a user dropdown, a search bar ('搜尋產品和資源'), and various icons for notifications and account management.

The main page title is '建立執行個體' (Create Instance). On the left, a sidebar lists options: '新增 VM 執行個體' (Create New VM Instance), '運用範本建立新的 VM 執行個體' (Create New VM Instance from Template), '運用機器映像檔建立新的 VM 執行個體' (Create New VM Instance from Image), and 'Marketplace'.

The main configuration area has several sections:

- 名稱**: gcpaic
- 標籤**: [+ ADD LABELS](#)
- 地區**: us-central1 (愛荷華州)
- 可用區**: us-central1-c
- 預估每月費用**: US\$25.46
- 每小時約為 US\$0.03**
- You have US\$8,340.00 free trial credits remaining**
- 用多少付多少**: 無須預繳費用，而且是以秒計費
- 詳細資訊**

機器設定 section includes:

- 機器系列**: E2
- 機器類型**: e2-medium (2 個 vCPU, 4 GB 記憶體)
- 顯示裝置**:
啟用即可使用螢幕畫面擷取和錄製工具。
 啟用顯示裝置

A vertical pink arrow on the right side of the interface points downwards, labeled '往下捲' (scroll down).

Call by GCE

以 VM 驗證 GCP AI

a. 建立 VM

建立執行個體

The screenshot shows the Google Cloud Platform (GCP) interface for creating a new VM instance. The top navigation bar includes 'Google Cloud Platform', a user dropdown, a search bar ('搜尋產品和資源'), and various icons for notifications and account management.

The main form is titled '建立執行個體' (Create Instance). It has several sections:

- 開機磁碟**:
 - 類型: 新的已平衡永久磁碟
 - 大小: 10 GB
 - 映像檔: Debian GNU/Linux 10 (buster)A '變更' button is highlighted with a pink box.
- 身分及 API 存取權**:
 - 服務帳戶: Compute Engine default service account
- 存取權範圍**:
 - 允許預設存取權
 - 允許所有 Cloud API 的完整存取權
 - 針對各個 API 設定存取權
- 防火牆**:
 - 您可以新增標記和防火牆規則，藉此接受來自網際網路的特定網路流量
 - 允許 HTTP 流量
 - 允許 HTTPS 流量

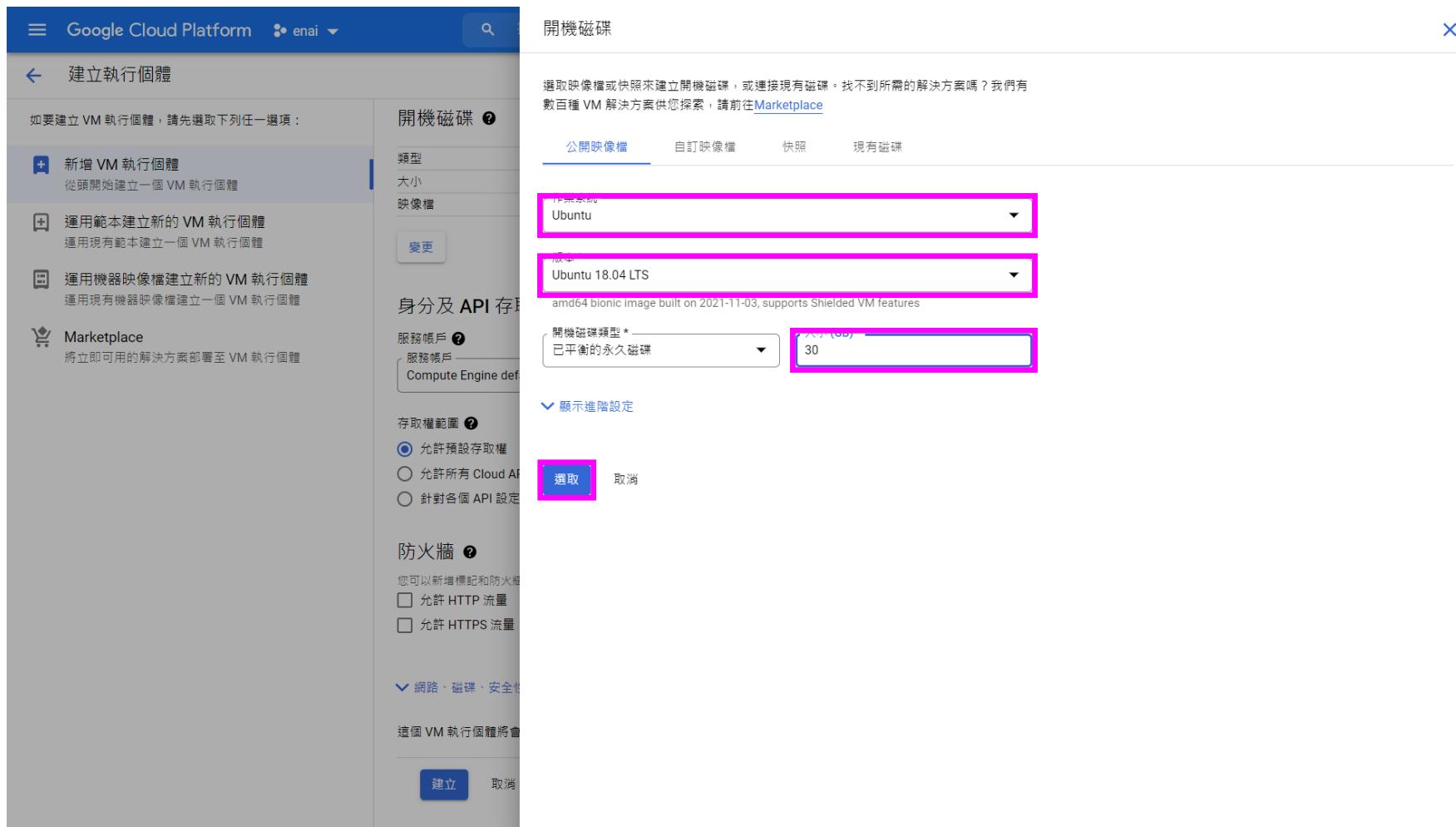
At the bottom, there is a note: '這個 VM 執行個體將會耗用您的免費試用額度。GCP 免費方案'. The '建立' (Create) button is highlighted with a pink box.

Call by GCE

以 VM 驗證 GCP AI

a. 建立 VM

建立執行個體



Call by GCE

以 VM 驗證 GCP AI

a. 建立 VM

建立執行個體

The screenshot shows the Google Cloud Platform (GCP) interface for creating a new VM instance. The top navigation bar includes the GCP logo, user info (enai), search bar, and various icons. The main page title is "建立執行個體". On the left, a sidebar lists four options: "新增 VM 執行個體" (selected), "運用範本建立新的 VM 執行個體", "運用機器映像檔建立新的 VM 執行個體", and "Marketplace". The main configuration area is titled "開機磁碟" and shows details: Type: 新的已平衡永久磁碟, Size: 30 GB, Image: Ubuntu 18.04 LTS. Below this is the "身分及 API 存取權" section, which is expanded to show the "服務帳戶" dropdown menu set to "Compute Engine default service account", highlighted with a pink rectangle. Under "存取權範圍", the radio button for "允許預設存取權" is selected. The "防火牆" section is partially visible at the bottom.

Call by GCE

以 VM 驗證 GCP AI

a. 建立 VM

建立執行個體

The screenshot shows the Google Cloud Platform (GCP) interface for deploying a container. The top navigation bar includes the GCP logo, user account (enai), search bar ('搜尋產品和資源'), and various icons for notifications and settings.

The main page title is '建立執行個體' (Create Instance). On the left, a sidebar lists options for creating a VM instance:

- 新增 VM 執行個體** (Create New VM Instance): Selected option, highlighted with a blue background.
- 運用範本建立新的 VM 執行個體** (Create New VM Instance from Template)
- 運用機器映像檔建立新的 VM 執行個體** (Create New VM Instance from Image)
- Marketplace** (Marketplace): Will automatically deploy solutions to the VM instance.

The main configuration area is titled 'DEPLOY CONTAINER'. It includes the following sections:

- 開機磁碟** (Boot Disk):
 - Type: 新的已平衡永久磁碟 (New Balanced Persistent Disk)
 - Size: 30 GB
 - Image: Ubuntu 18.04 LTS
- 身分及 API 存取權** (Identity & API Access):
 - Service Account: gcpai (highlighted with a pink rectangle)
 - Access Scope: Allows managing VM access through service accounts.
- 防火牆** (Firewall):
 - You can add tags and firewall rules to accept specific network traffic.
 - Allow HTTP traffic:
 - Allow HTTPS traffic:

At the bottom, there is a note: '這個 VM 執行個體將會耗用您的免費試用額度。GCP 免費方案' (This VM instance will consume your free trial quota. GCP Free Tier).

At the very bottom, there are three buttons: '建立' (Create) in a blue box, '取消' (Cancel), and '對等指令列' (Peer-to-Peer Command Line).

Call by GCE

以 VM 驗證 GCP AI b. 初始化 VM

連結執行個體

The screenshot shows the Google Cloud Platform Compute Engine interface. The left sidebar has sections for VM execution instances, storage space (disks, snapshots, images), and VM instance groups. The main content area displays a list of VM instances. One instance, named 'gcpaic', is selected and highlighted with a green checkmark. Its details are shown in a table:

狀態	名稱	區域	建議	使用者	內部 IP	外部 IP	連線
<input type="checkbox"/>	<input checked="" type="checkbox"/> gcpaic	us-central1-c			10.128.0.2 (nic0)	35.239.130.20	SSH

Below the table, there are several related operations:

- 查看帳單報表 (View Bill Report) - 查看及管理 Compute Engine 帳單
- 監控 VM (Monitor VM) - 查看 CPU 和網路等不同指標中的離群 VM
- 探索 VM 記錄檔 (Explore VM Log Files) - 查看、搜尋、分析及下載 VM 執行個體記錄檔
- 設定防火牆規則 (Set Firewall Rules) - 控管 VM 執行個體的往來流量
- 管理修補程式 (Manage Patching) - 排定修補程式的更新時間，以及查看 VM 執行個體安裝修補程式的狀態

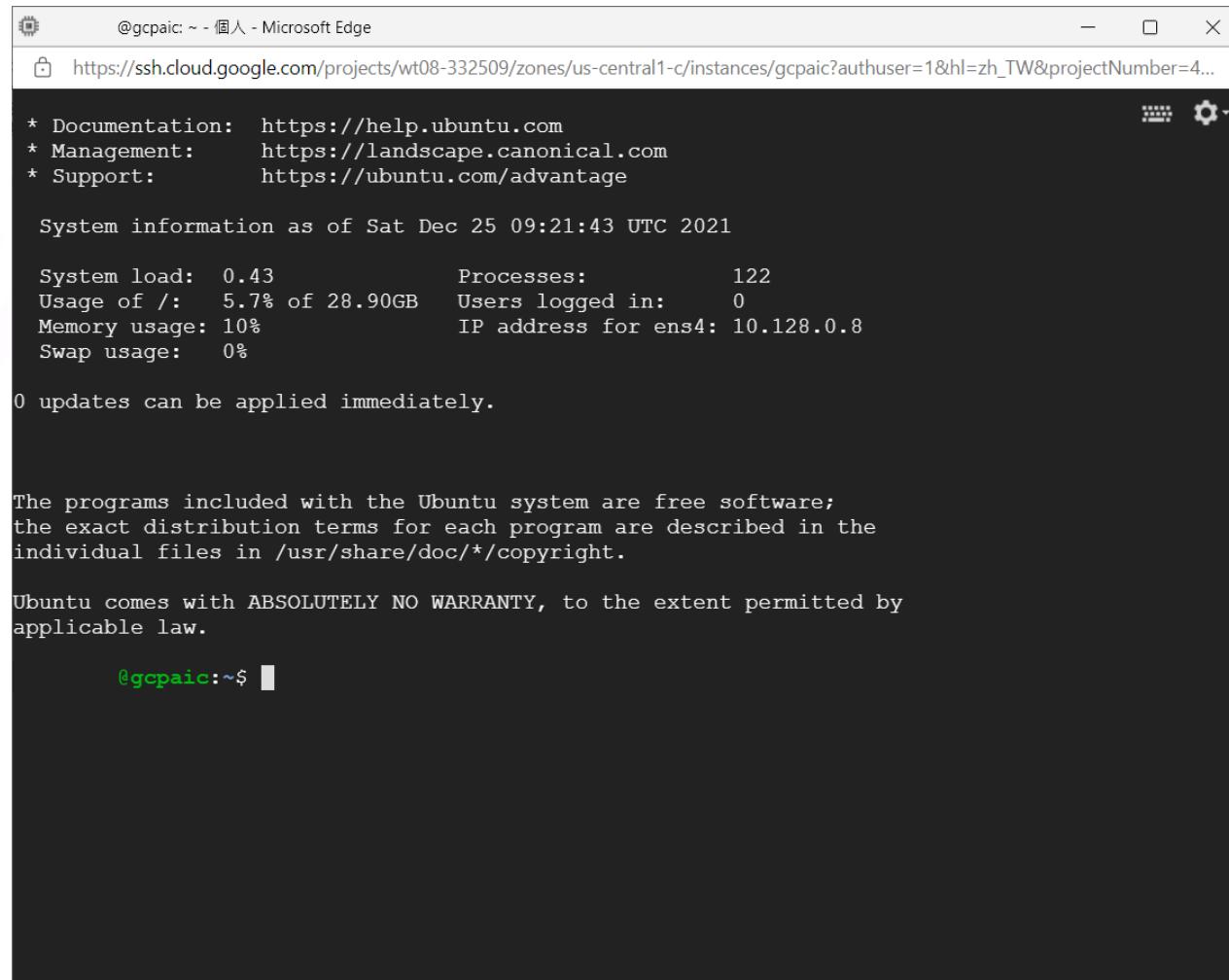
On the right side, there are tabs for PERMISSIONS, LABELS, and MONITORING. A message at the bottom right says "請至少選取一項資源。"

Call by GCE

以 VM 驗證 GCP AI

b. 初始化 VM

連結執行個體



The screenshot shows a Microsoft Edge window with a terminal session running on a GCP VM. The URL in the address bar is https://ssh.cloud.google.com/projects/wt08-332509/zones/us-central1-c/instances/gcpaic?authuser=1&hl=zh_TW&projectNumber=4.... The terminal output displays system information and a copyright notice.

```
@gcpaic: ~ - 個人 - Microsoft Edge
https://ssh.cloud.google.com/projects/wt08-332509/zones/us-central1-c/instances/gcpaic?authuser=1&hl=zh_TW&projectNumber=4...
* Documentation: https://help.ubuntu.com
* Management: https://landscape.canonical.com
* Support: https://ubuntu.com/advantage

System information as of Sat Dec 25 09:21:43 UTC 2021

System load: 0.43          Processes: 122
Usage of /: 5.7% of 28.90GB  Users logged in: 0
Memory usage: 10%          IP address for ens4: 10.128.0.8
Swap usage: 0%

0 updates can be applied immediately.

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

@gcpaic:~$
```

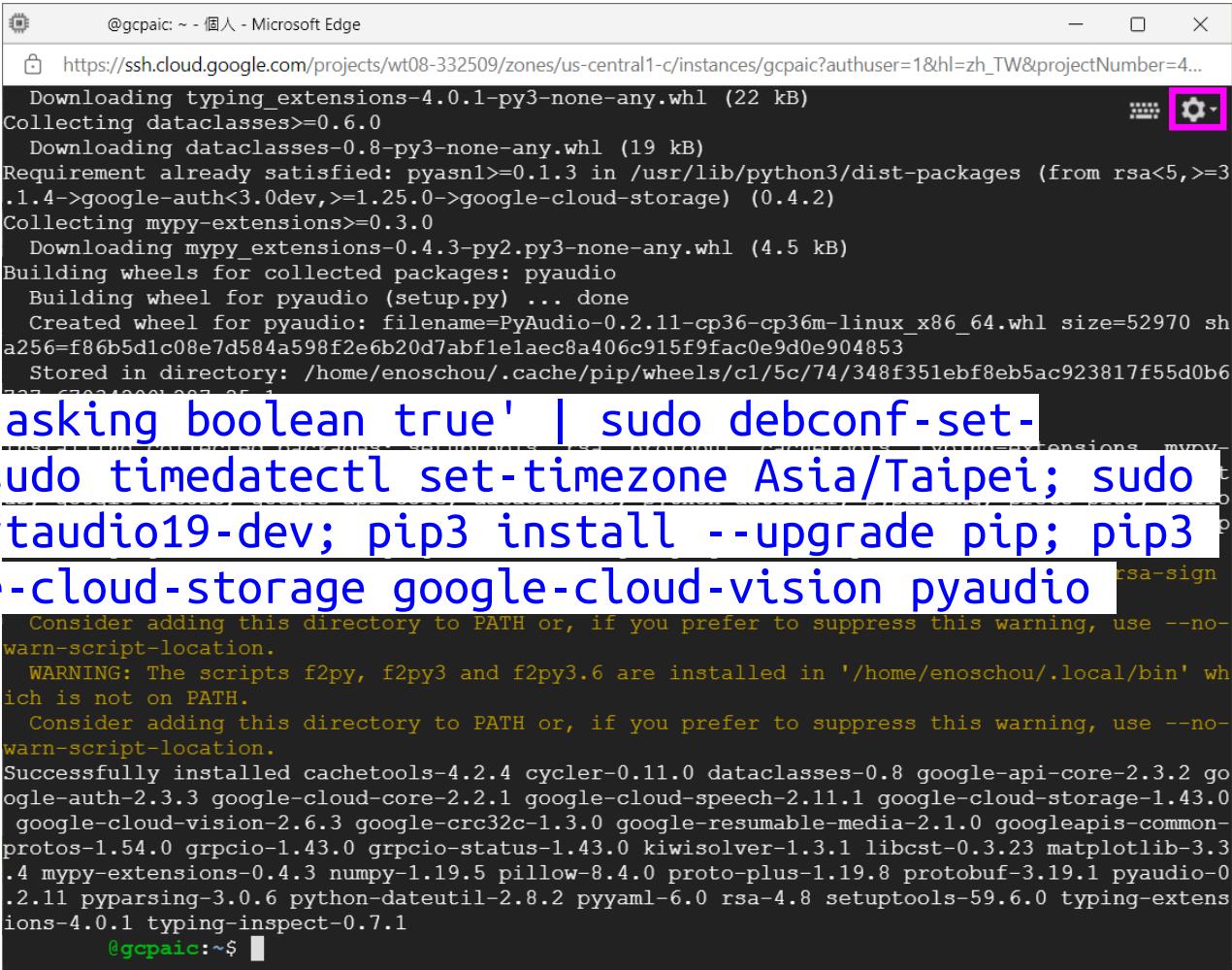
Call by GCE

以 VM 驗證 GCP AI

b. 初始化 VM

安裝必要函式庫與套件

```
echo '* libraries/restart-without-asking boolean true' | sudo debconf-set-selections; sudo apt-get update; sudo timedatectl set-timezone Asia/Taipei; sudo apt-get install -y python3-pip portaudio19-dev; pip3 install --upgrade pip; pip3 install google-cloud-speech google-cloud-storage google-cloud-vision pyaudio matplotlib --upgrade
```



The screenshot shows a Microsoft Edge browser window with a terminal-like interface. The title bar says '@gcpaic: ~ - 個人 - Microsoft Edge'. The address bar shows a URL starting with 'https://ssh.cloud.google.com/projects/wt08-332509/zones/us-central1-c/instances/gcpaic?authuser=1&hl=zh_TW&projectNumber=4...'. The main content area displays the output of a pip3 upgrade command. It shows several packages being downloaded and built, including 'typing_extensions-4.0.1-py3-none-any.whl', 'dataclasses-0.6.0', 'dataclasses-0.8-py3-none-any.whl', 'pyasn1>=0.1.3', 'google-auth<3.0dev,>=1.25.0->google-cloud-storage (0.4.2)', 'mypy-extensions>=0.3.0', 'mypy_extensions-0.4.3-py2.py3-none-any.whl', and 'pyaudio'. It also shows a warning about scripts being installed in '/home/enoschou/.local/bin' which is not on PATH, and a note about successfully installing various Google Cloud Python libraries.

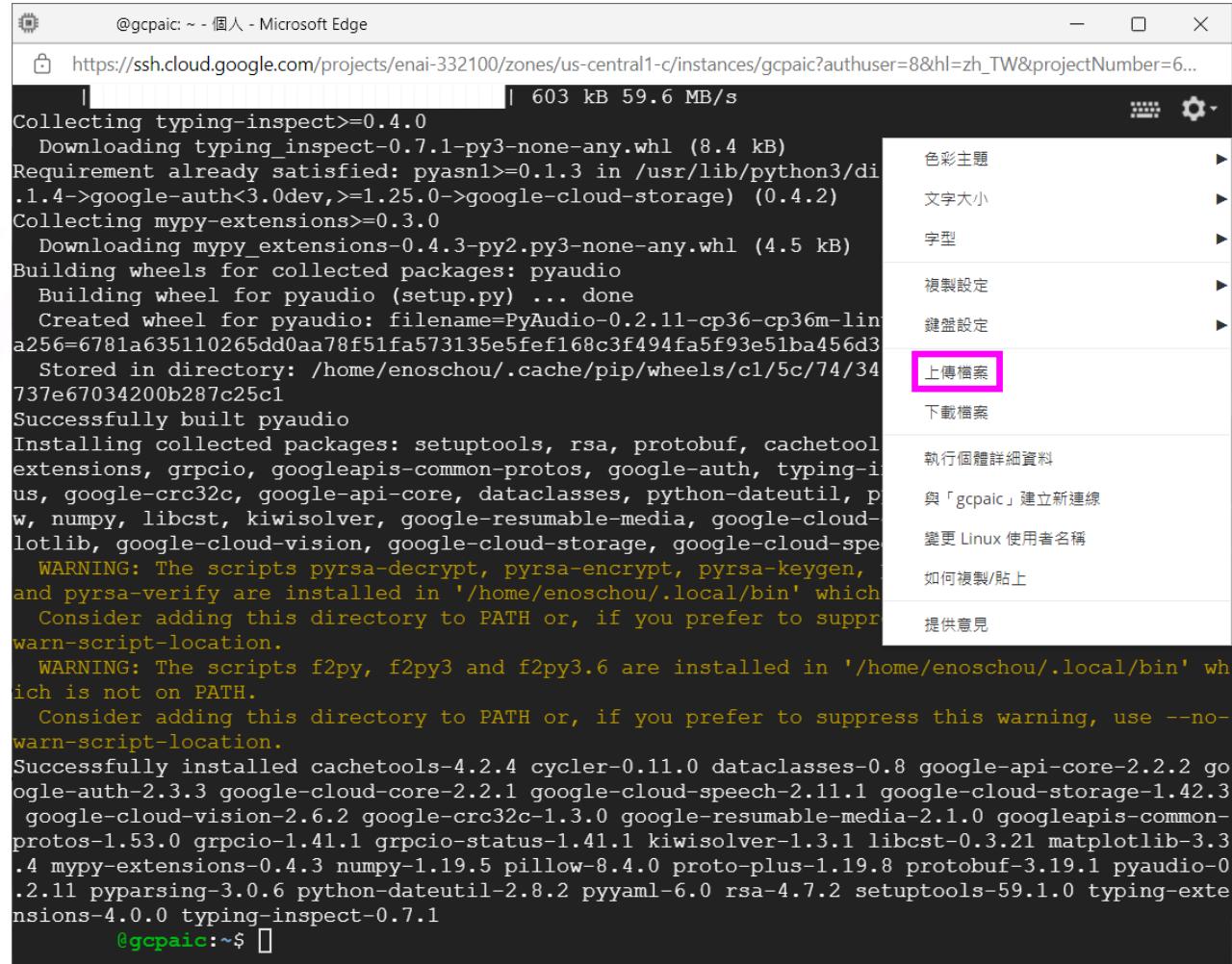
```
Downloading typing_extensions-4.0.1-py3-none-any.whl (22 kB)
Collecting dataclasses>=0.6.0
  Downloading dataclasses-0.8-py3-none-any.whl (19 kB)
Requirement already satisfied: pyasn1>=0.1.3 in /usr/lib/python3/dist-packages (from rsa<5,>=3.1.4->google-auth<3.0dev,>=1.25.0->google-cloud-storage) (0.4.2)
Collecting mypy-extensions>=0.3.0
  Downloading mypy_extensions-0.4.3-py2.py3-none-any.whl (4.5 kB)
Building wheels for collected packages: pyaudio
  Building wheel for pyaudio (setup.py) ... done
    Created wheel for pyaudio: filename=PyAudio-0.2.11-cp36-cp36m-linux_x86_64.whl size=52970 sha256=f86b5d1c08e7d584a598f2e6b20d7abf1e1aec8a406c915f9fac0e9d0e904853
    Stored in directory: /home/enoschou/.cache/pip/wheels/c1/5c/74/348f351ebf8eb5ac923817f55d0b67276792342001287_251
Consider adding this directory to PATH or, if you prefer to suppress this warning, use --no-warn-script-location.
WARNING: The scripts f2py, f2py3 and f2py3.6 are installed in '/home/enoschou/.local/bin' which is not on PATH.
Consider adding this directory to PATH or, if you prefer to suppress this warning, use --no-warn-script-location.
Successfully installed cachetools-4.2.4 cycler-0.11.0 dataclasses-0.8 google-api-core-2.3.2 google-auth-2.3.3 google-cloud-core-2.2.1 google-cloud-speech-2.11.1 google-cloud-storage-1.43.0 google-cloud-vision-2.6.3 google-crc32c-1.3.0 google-resumable-media-2.1.0 googleapis-common-protos-1.54.0 grpcio-1.43.0 grpcio-status-1.43.0 kiwisolver-1.3.1 libcst-0.3.23 matplotlib-3.3.4 mypy-extensions-0.4.3 numpy-1.19.5 pillow-8.4.0 proto-plus-1.19.8 protobuf-3.19.1 pyaudio-0.2.11 pyparsing-3.0.6 python-dateutil-2.8.2 pyyaml-6.0 rsa-4.8 setuptools-59.6.0 typing-extensions-4.0.1 typing-inspect-0.7.1
@gcpaic:~$
```

Call by GCE

以 VM 驗證 GCP AI

c. 叫用 GCP AI

準備測試檔案



The screenshot shows a Microsoft Edge browser window with a terminal-like interface. The URL bar shows a connection to an SSH session on a Google Cloud Compute Engine instance. The main content area displays the output of a pip install command for several Google Cloud Python libraries. The terminal prompt at the bottom right is '@gcpaic: ~ \$'. A context menu is open on the right side of the screen, with the 'Upload file' option highlighted in red.

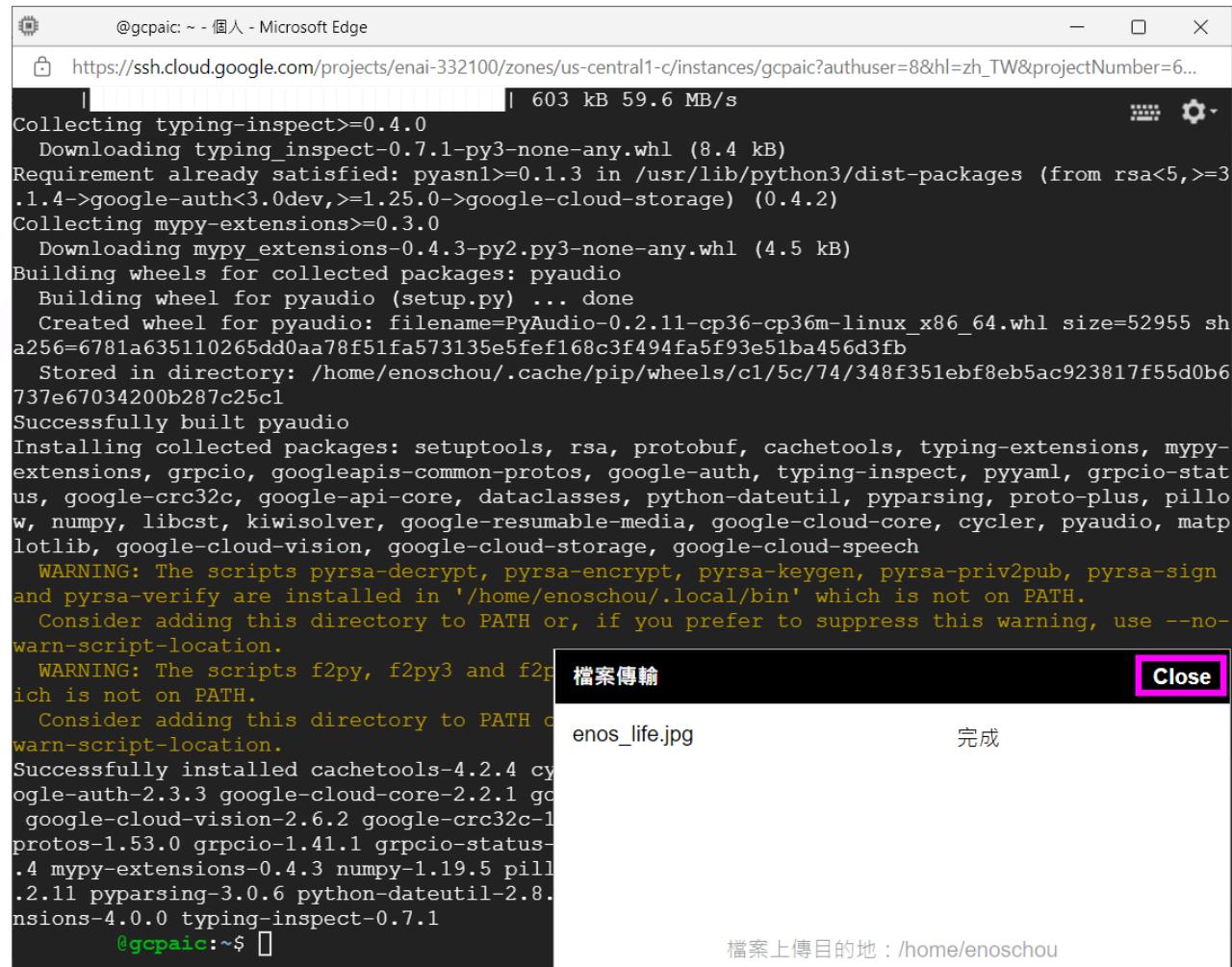
```
Collecting typing-inspect>=0.4.0
  Downloading typing_inspect-0.7.1-py3-none-any.whl (8.4 kB)
Requirement already satisfied: pyasn1>=0.1.3 in /usr/lib/python3/dist-packages (from typing-inspect>=0.4.0)
Collecting mypy-extensions>=0.3.0
  Downloading mypy_extensions-0.4.3-py2.py3-none-any.whl (4.5 kB)
Building wheels for collected packages: pyaudio
  Building wheel for pyaudio (setup.py) ... done
    Created wheel for pyaudio: filename=PyAudio-0.2.11-cp36-cp36m-linux-aarch64-*.whl
      Stored in directory: /home/enoschou/.cache/pip/wheels/c1/5c/74/34737e67034200b287c25c1
    Successfully built pyaudio
Installing collected packages: setuptools, rsa, protobuf, cachetools, extensions, grpcio, googleapis-common-protos, google-auth, typing-inspect, google-crc32c, google-api-core, dataclasses, python-dateutil, pyparsing, numpy, libcst, kiwisolver, google-resumable-media, google-cloud-lotlib, google-cloud-vision, google-cloud-storage, google-cloud-speech
  WARNING: The scripts pyrsa-decrypt, pyrsa-encrypt, pyrsa-keygen, and pyrsa-verify are installed in '/home/enoschou/.local/bin' which is not on PATH.
    Consider adding this directory to PATH or, if you prefer to suppress this warning, use --no-warn-script-location.
  WARNING: The scripts f2py, f2py3 and f2py3.6 are installed in '/home/enoschou/.local/bin' which is not on PATH.
    Consider adding this directory to PATH or, if you prefer to suppress this warning, use --no-warn-script-location.
Successfully installed cachetools-4.2.4 cycler-0.11.0 dataclasses-0.8 google-api-core-2.2.2 google-auth-2.3.3 google-cloud-core-2.2.1 google-cloud-speech-2.11.1 google-cloud-storage-1.42.3 google-cloud-vision-2.6.2 grpcio-crc32c-1.3.0 google-resumable-media-2.1.0 googleapis-common-protos-1.53.0 grpcio-1.41.1 grpcio-status-1.41.1 kiwisolver-1.3.1 libcst-0.3.21 matplotlib-3.3.4 mypy-extensions-0.4.3 numpy-1.19.5 pillow-8.4.0 proto-plus-1.19.8 protobuf-3.19.1 pyaudio-0.2.11 pyparsing-3.0.6 python-dateutil-2.8.2 pyyaml-6.0 rsa-4.7.2 setuptools-59.1.0 typing-extensions-4.0.0 typing-inspect-0.7.1
@gcpaic:~$
```

Call by GCE

以 VM 驗證 GCP AI

c. 叫用 GCP AI

準備測試檔案



The screenshot shows a Microsoft Edge browser window with a terminal-like interface. The URL bar shows a connection to an SSH session on a Google Cloud Compute Engine instance. The terminal output displays the process of installing various Python packages via pip, including typing-inspect, pyaudio, and several Google Cloud libraries like google-auth, google-cloud-storage, and google-cloud-vision. A progress bar at the top indicates a download speed of 603 kB/s. Below the terminal, a file upload dialog box is open, showing a file named "enos_life.jpg" ready to be uploaded to the "/home/enoschou" directory.

```
@gcpaic: ~ - 個人 - Microsoft Edge
https://ssh.cloud.google.com/projects/enai-332100/zones/us-central1-c/instances/gcpaic?authuser=8&hl=zh_TW&projectNumber=6...
| 603 kB 59.6 MB/s
Collecting typing-inspect>=0.4.0
  Downloading typing_inspect-0.7.1-py3-none-any.whl (8.4 kB)
Requirement already satisfied: pyasn1>=0.1.3 in /usr/lib/python3/dist-packages (from rsa<5,>=3.1.4->google-auth<3.0dev,>=1.25.0->google-cloud-storage) (0.4.2)
Collecting mypy-extensions>=0.3.0
  Downloading mypy_extensions-0.4.3-py2.py3-none-any.whl (4.5 kB)
Building wheels for collected packages: pyaudio
  Building wheel for pyaudio (setup.py) ... done
    Created wheel for pyaudio: filename=PyAudio-0.2.11-cp36-cp36m-linux_x86_64.whl size=52955 sha256=6781a635110265dd0aa78f51fa573135e5fef168c3f494fa5f93e51ba456d3fb
    Stored in directory: /home/enoschou/.cache/pip/wheels/c1/5c/74/348f351ebf8eb5ac923817f55d0b6737e67034200b287c25c1
Successfully built pyaudio
Installing collected packages: setuptools, rsa, protobuf, cachetools, typing-extensions, mypy-extensions, grpcio, googleapis-common-protos, google-auth, typing-inspect, pyyaml, grpcio-status, google-crc32c, google-api-core, dataclasses, python-dateutil, pyparsing, proto-plus, pillow, numpy, libcst, kiwisolver, google-resumable-media, google-cloud-core, cycler, pyaudio, matplotlib, google-cloud-vision, google-cloud-storage, google-cloud-speech
  WARNING: The scripts pyrsa-decrypt, pyrsa-encrypt, pyrsa-keygen, pyrsa-priv2pub, pyrsa-sign and pyrsa-verify are installed in '/home/enoschou/.local/bin' which is not on PATH.
  Consider adding this directory to PATH or, if you prefer to suppress this warning, use --no-warn-script-location.
  WARNING: The scripts f2py, f2py3 and f2pyich is not on PATH.
  Consider adding this directory to PATH or, if you prefer to suppress this warning, use --no-warn-script-location.
Successfully installed cachetools-4.2.4 cycler-0.10.0 google-auth-2.3.3 google-cloud-core-2.2.1 google-cloud-vision-2.6.2 google-crc32c-1 protos-1.53.0 grpcio-1.41.1 grpcio-status-0.4 mypy-extensions-0.4.3 numpy-1.19.5 pillow-7.2.1 pyparsing-3.0.6 python-dateutil-2.8.1 nsions-4.0.0 typing-inspect-0.7.1
@gcpaic:~$
```

檔案傳輸

enos_life.jpg 完成

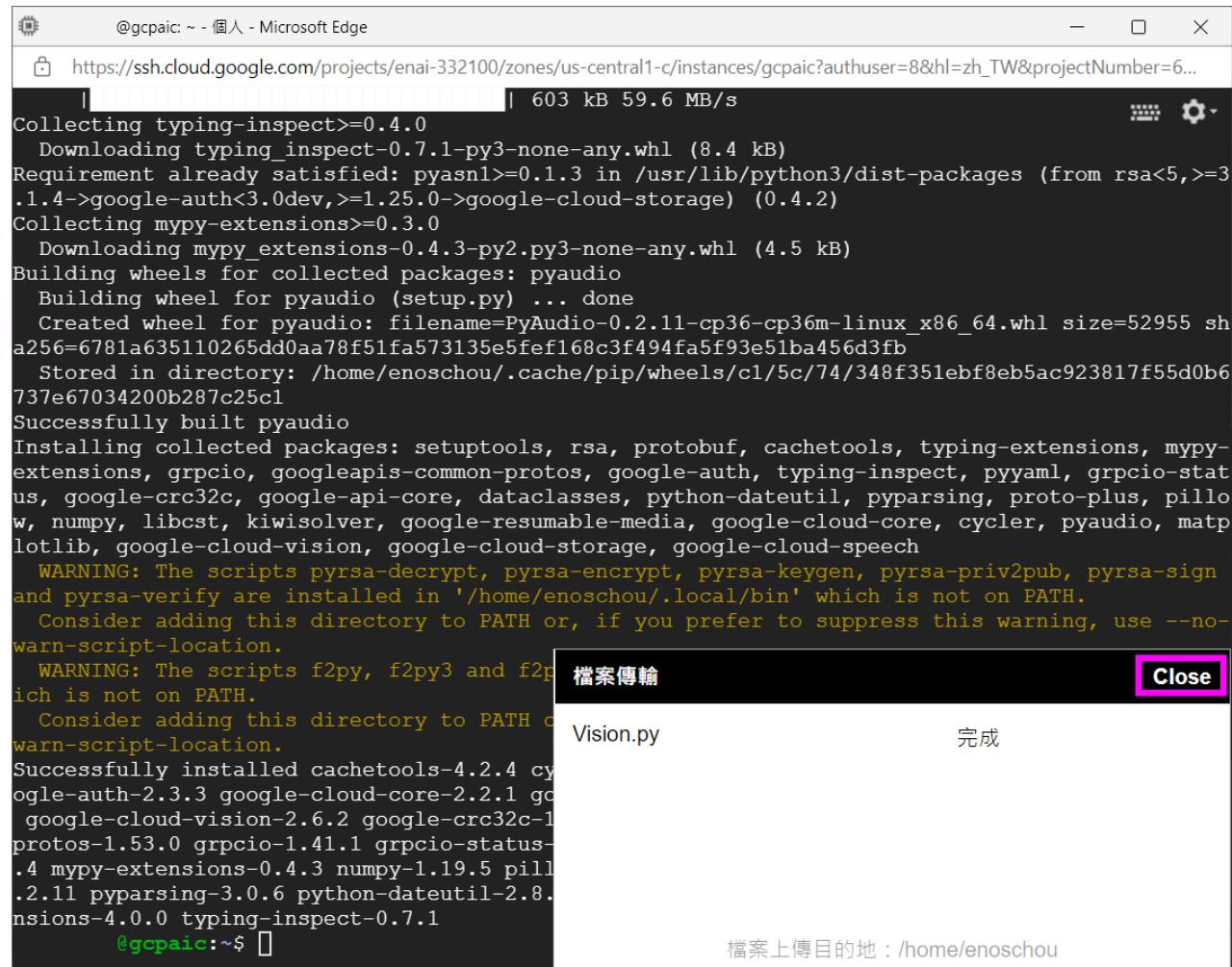
檔案上傳目的地 : /home/enoschou

Call by GCE

以 VM 驗證 GCP AI

c. 叫用 GCP AI

準備測試程式



```
@gcpaic: ~ - 個人 - Microsoft Edge
https://ssh.cloud.google.com/projects/enai-332100/zones/us-central1-c/instances/gcpaic?authuser=8&hl=zh_TW&projectNumber=6...
| 603 kB 59.6 MB/s
Collecting typing-inspect>=0.4.0
  Downloading typing_inspect-0.7.1-py3-none-any.whl (8.4 kB)
Requirement already satisfied: pyasn1>=0.1.3 in /usr/lib/python3/dist-packages (from rsa<5,>=3.1.4->google-auth<3.0dev,>=1.25.0->google-cloud-storage) (0.4.2)
Collecting mypy-extensions>=0.3.0
  Downloading mypy_extensions-0.4.3-py2.py3-none-any.whl (4.5 kB)
Building wheels for collected packages: pyaudio
  Building wheel for pyaudio (setup.py) ... done
    Created wheel for pyaudio: filename=PyAudio-0.2.11-cp36-cp36m-linux_x86_64.whl size=52955 sha256=6781a635110265dd0aa78f51fa573135e5fef168c3f494fa5f93e51ba456d3fb
    Stored in directory: /home/enoschou/.cache/pip/wheels/c1/5c/74/348f351ebf8eb5ac923817f55d0b6737e67034200b287c25c1
  Successfully built pyaudio
Installing collected packages: setuptools, rsa, protobuf, cachetools, typing-extensions, mypy-extensions, grpcio, googleapis-common-protos, google-auth, typing-inspect, pyyaml, grpcio-status, google-crc32c, google-api-core, dataclasses, python-dateutil, pyparsing, proto-plus, pillow, numpy, libcst, kiwisolver, google-resumable-media, google-cloud-core, cycler, pyaudio, matplotlib, google-cloud-vision, google-cloud-storage, google-cloud-speech
  WARNING: The scripts pyrsa-decrypt, pyrsa-encrypt, pyrsa-keygen, pyrsa-priv2pub, pyrsa-sign and pyrsa-verify are installed in '/home/enoschou/.local/bin' which is not on PATH.
  Consider adding this directory to PATH or, if you prefer to suppress this warning, use --no-warn-script-location.
  WARNING: The scripts f2py, f2py3 and f2pyich is not on PATH.
  Consider adding this directory to PATH or, if you prefer to suppress this warning, use --no-warn-script-location.
  Successfully installed cachetools-4.2.4 certifi-2021.10.8 google-auth-2.3.3 google-cloud-core-2.2.1 google-cloud-vision-2.6.2 google-crc32c-1 protos-1.53.0 grpcio-1.41.1 grpcio-status-0.4 mypy-extensions-0.4.3 numpy-1.19.5 pillow-3.4.2 pyparsing-3.0.6 python-dateutil-2.8.1 nsions-4.0.0 typing-inspect-0.7.1
@gcpaic:~$ 
```

檔案傳輸

Vision.py

完成

檔案上傳目的地 : /home/enoschou

Call by GCE

以 VM 驗證 GCP AI

c. 叫用 GCP AI

Vision.py

```
from google.cloud import vision  
  
YOUR_PIC = 'YOUR_PIC'
```

```
client = vision.ImageAnnotatorClient()  
with open(YOUR_PIC, 'rb') as image_file:  
    content = image_file.read()  
image = vision.Image(content=content)  
response = client.label_detection(image=image)  
print(response)
```

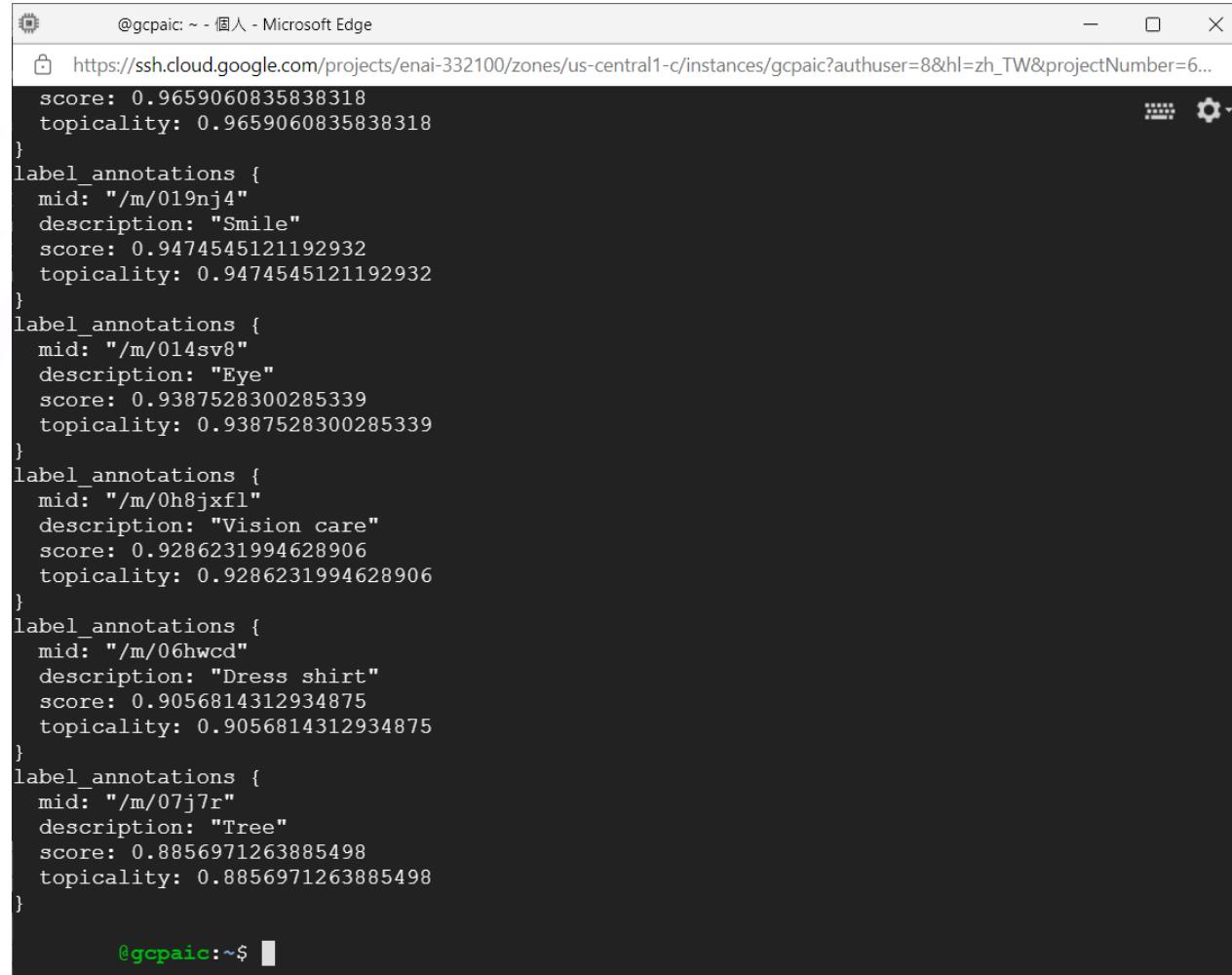
Call by GCE

以 VM 驗證 GCP AI

c. 叫用 GCP AI

執行測試

python3 Vision.py



The screenshot shows a Microsoft Edge browser window displaying a JSON response from a GCP AI API. The URL in the address bar is https://ssh.cloud.google.com/projects/enai-332100/zones/us-central1-c/instances/gcpaic?authuser=8&hl=zh_TW&projectNumber=6.... The JSON output lists several label annotations with their mid, description, score, and topicality.

```
score: 0.9659060835838318
topicality: 0.9659060835838318
}
label_annotations {
    mid: "/m/019nj4"
    description: "Smile"
    score: 0.9474545121192932
    topicality: 0.9474545121192932
}
label_annotations {
    mid: "/m/014sv8"
    description: "Eye"
    score: 0.9387528300285339
    topicality: 0.9387528300285339
}
label_annotations {
    mid: "/m/0h8jxfl"
    description: "Vision care"
    score: 0.9286231994628906
    topicality: 0.9286231994628906
}
label_annotations {
    mid: "/m/06hwcd"
    description: "Dress shirt"
    score: 0.9056814312934875
    topicality: 0.9056814312934875
}
label_annotations {
    mid: "/m/07j7r"
    description: "Tree"
    score: 0.8856971263885498
    topicality: 0.8856971263885498
}
```

@gcpaic:~\$

No-Code AI Serving Imported AI on GCP

Deploy Imported Model on Vertex AI

Deploy Imported Model by Vertex AI

價格

<https://cloud.google.com/vertex-ai/> > 定價 > 總價費率

Deploy Imported Model by Vertex AI

客製模型部署

- a. 準備模型
- b. 上傳模型
- c. 部署模型
- d. 叫用模型

Deploy Imported Model by Vertex AI

客製模型部署

a. 準備模型

模型規格

- TensorFlow SavedModel
- TensorFlow v1.15, v2.1 ~ v2.6
- 若為 .h5 (by Keras) , 需轉換為 TensorFlow SavedModel

Deploy Imported Model by Vertex AI

客製模型部署

a. 準備模型

套件 TensorFlow

```
pip install tensorflow==2.4.3 # 1.15, 2.1 ~ 2.6 is OK
```

Deploy Imported Model by Vertex AI

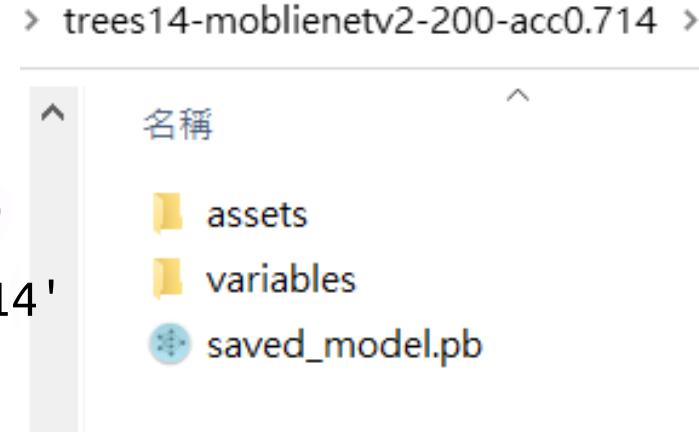
客製模型部署

a. 準備模型

HDF5 (Keras .h5) 轉 SavedModel (TensorFlow)

```
import os
from tensorflow import keras

YOUR_HDF5_MODEL = 'trees14-moblienetv2-200-acc0.714.h5'
YOUR_SAVEDMODEL_PATH = 'trees14-moblienetv2-200-acc0.714'
model = keras.models.load_model(YOUR_HDF5_MODEL)
if not os.path.exists(YOUR_SAVEDMODEL_PATH):
    os.mkdir(YOUR_SAVEDMODEL_PATH)
model.save(YOUR_SAVEDMODEL_PATH, save_format='tf')
```

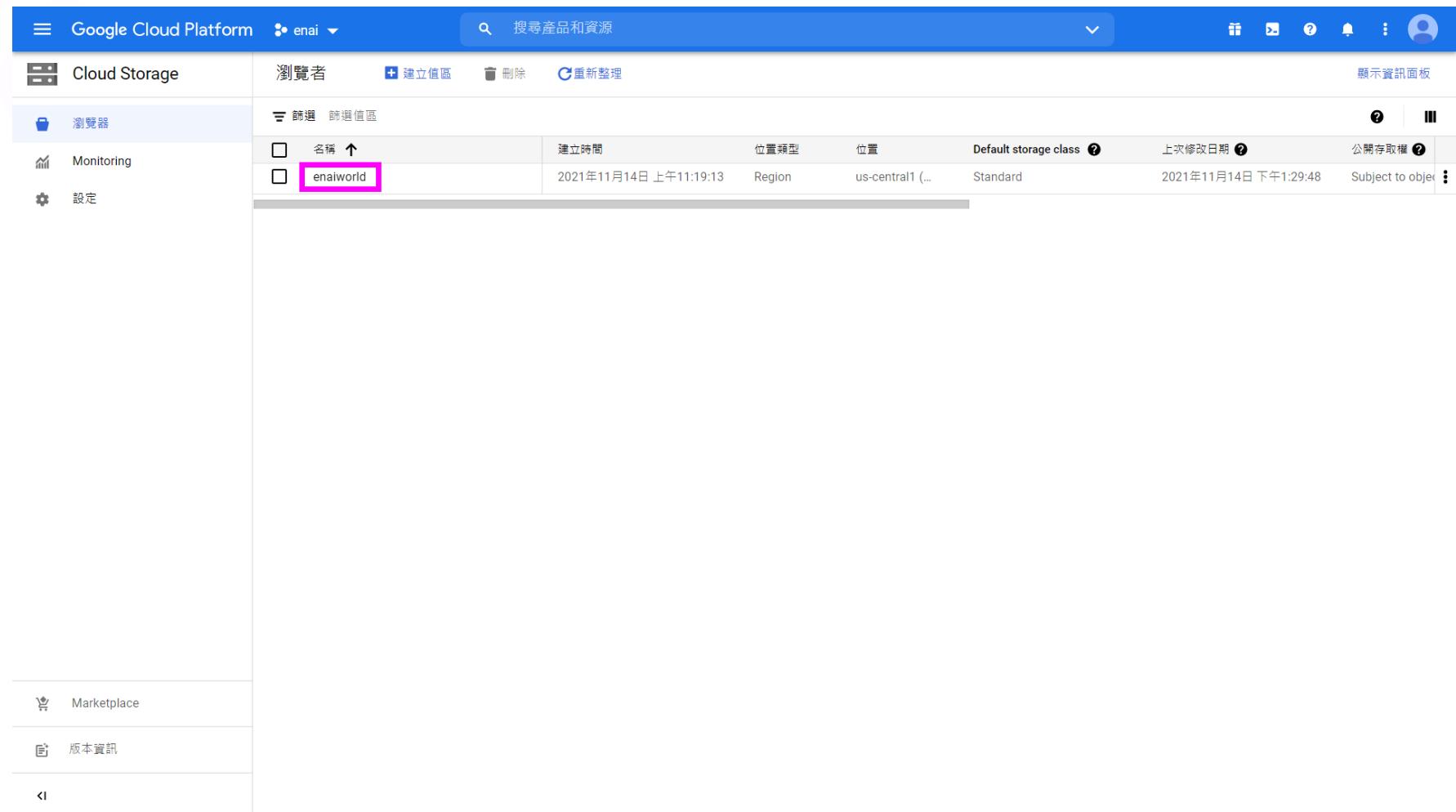


Deploy Imported Model by Vertex AI

客製模型部署

b. 上傳模型

上傳模型資料夾



The screenshot shows the Google Cloud Platform Cloud Storage interface. On the left, there is a sidebar with links for 'Cloud Storage', 'Monitoring', and 'Marketplace'. The main area displays a table of storage buckets. A new bucket named 'enaiworld' is listed, highlighted with a pink box. The table columns include '名稱' (Name), '建立時間' (Created Time), '位置類型' (Location Type), '位置' (Location), 'Default storage class' (Default Storage Class), '上次修改日期' (Last Modified Date), and '公開存取權' (Public Access). The 'enaiworld' row shows values: Name: enaiworld, Created Time: 2021年11月14日上午11:19:13, Location Type: Region, Location: us-central1 (...), Default Storage Class: Standard, Last Modified Date: 2021年11月14日下午1:29:48, and Public Access: Subject to object-level control.

名稱	建立時間	位置類型	位置	Default storage class	上次修改日期	公開存取權
enaiworld	2021年11月14日上午11:19:13	Region	us-central1 (...)	Standard	2021年11月14日下午1:29:48	Subject to object-level control

Deploy Imported Model by Vertex AI

客製模型部署 b. 上傳模型

上傳模型資料夾

The screenshot shows the Google Cloud Platform Cloud Storage interface for the 'enaiworld' bucket. The left sidebar has 'Cloud Storage' selected. The main area shows the 'enaiworld' bucket details: Location: us-central1 (愛荷華州), Storage class: Standard, Public access: Standard, Protection: None. Below this are tabs for 'Objects', 'Settings', 'Permissions', 'Protection', and 'Lifecycle'. The 'Upload Folders' tab is highlighted with a pink box. The 'Upload Folders' section shows a list of files and folders uploaded to the 'enaiworld' bucket. The columns include Name, Size, Type, Created Time, Storage Class, Last Modified, Public Access, Version Record, Encryption, and Retention. The list includes 'audio-files/' (folder), 'audio.wav', 'enos_life.jpg', 'enos_new.jpg', 'generated_workspace_file.json', 'todayweather (online-audio-convert)', 'todayweather.flac', and 'transcripts/'. The bottom of the page shows navigation links for 'Marketplace' and 'Version History'.

Name	Size	Type	Created Time	Storage Class	Last Modified	Public Access	Version Record	Encryption	Retention
audio-files/	-	資料夾	-	-	-	-	-	-	-
audio.wav	860 KB	audio/wav	2021年11...	Standard	2021年11...	非公開	-	Google-managed key	-
enos_life.jpg	228.3 KB	image/jpeg	2021年11...	Standard	2021年11...	非公開	-	Google-managed key	-
enos_new.jpg	250.3 KB	image/jpeg	2021年11...	Standard	2021年11...	非公開	-	Google-managed key	-
generated_workspace_file.json	1 KB	text/plain	2021年11...	Standard	2021年11...	非公開	-	Google-managed key	-
todayweather (online-audio-convert)	540.7 KB	audio/x-flac	2021年11...	Standard	2021年11...	非公開	-	Google-managed key	-
todayweather.flac	540.7 KB	audio/x-flac	2021年11...	Standard	2021年11...	非公開	-	Google-managed key	-
transcripts/	-	資料夾	-	-	-	-	-	-	-

Deploy Imported Model by Vertex AI

客製模型部署 b. 上傳模型

上傳模型資料夾

The screenshot shows the Google Cloud Platform Cloud Storage interface. On the left, there's a sidebar with 'Cloud Storage' selected. The main area shows a bucket named 'enaiworld'. A modal dialog box is open, asking '將 3 個檔案上傳到此網站？' (Upload 3 files to this website?). It includes a warning: '這將從『trees14-moblienetv2-200-acc0.714』上傳所有檔案。當您信任該網站時再執行這項操作。' (This will upload all files from 'trees14-moblienetv2-200-acc0.714'. Execute this operation only if you trust the website.) with '上傳' (Upload) and '取消' (Cancel) buttons. Below the modal, the bucket details show: Location: us-central1 (愛荷華州), Storage class: Standard, Public access: Standard, and Protection: No ACL restrictions. The 'Objects' tab is selected, showing a list of files and folders uploaded to the bucket. The table includes columns for Name, Size, Type, Created time, Storage class, Last modified, Public access, Version history, Encryption, and Retention. The files listed are: 'audio-files/' (size -), 'audio.wav' (860 KB, audio/wav, 2021-11-14, Standard, 2021-11-14, Non-public, Google-managed key), 'enos_life.jpg' (228.3 KB, image/jpeg, 2021-11-14, Standard, 2021-11-14, Non-public, Google-managed key), 'enos_new.jpg' (250.3 KB, image/jpeg, 2021-11-14, Standard, 2021-11-14, Non-public, Google-managed key), 'generated_workspace_file.json' (1 KB, text/plain, 2021-11-14, Standard, 2021-11-14, Non-public, Google-managed key), 'todayweather (online-audio-convert)' (540.7 KB, audio/x-flac, 2021-11-14, Standard, 2021-11-14, Non-public, Google-managed key), 'todayweather.flac' (540.7 KB, audio/x-flac, 2021-11-14, Standard, 2021-11-14, Non-public, Google-managed key), and 'transcripts/' (size -). At the bottom, there are links for 'Marketplace' and '版本資訊'.

Deploy Imported Model by Vertex AI

客製模型部署 b. 上傳模型

上傳模型資料夾

The screenshot shows the Google Cloud Platform Cloud Storage interface. The left sidebar has 'Cloud Storage' selected. The main area shows a bucket named 'enaiworld'. The bucket details are as follows:

- 位置: us-central1 (愛荷華州)
- 儲存空間級別: Standard
- 公開存取權: 受到物件 ACL 的限制
- 防護措施: 無

The '物件' tab is selected. Below it, there's a navigation bar with links: 上傳檔案, 上傳資料夾, 建立資料夾, 管理訴訟保留, 下載, 刪除. A filter bar above the list says '只依名稱前置字串篩選' and '篩選 選擇物件和資料夾'. The main table lists several files and folders:

名稱	大小	類型	建立時間	儲存空間級別	上次修改日期	公開存取權	版本記錄	加密	保留到期
audio-files/	-	資料夾	-	-	-	-	-	-	-
audio.wav	860 KB	audio/wav	2021年11...	Standard	2021年11...	非公開	-	Google-managed key	-
enos_life.jpg	228.3 KB	image/jpeg	2021年11...	Standard	2021年11...	非公開	-	Google-managed key	-
enos_new.jpg	250.3 KB	image/jpeg	2021年11...	Standard	2021年11...	非公開	-	Google-managed key	-
generated_workspace_file.json	1 KB	text/plain	2021年11...	Standard	2021年11...	非公開	-	Google-managed key	-
todayweather (online-audio-convert	540.7 KB	audio/x-flac	2021年11...	Standard	2021年11...	非公開	-	Google-managed key	-
todayweather.flac	540.7 KB	audio/x-flac	2021年11...	Standard	2021年11...	非公開	-	Google-managed key	-
transcripts/	-	資料夾	-	-	-	-	-	-	-
trees14-mobilenetv2-200-acc0.714	-	資料夾	-	-	-	-	-	-	-

Deploy Imported Model by Vertex AI

客製模型部署

c. 部署模型

啟用 Vertex AI API

The screenshot shows the Google Cloud Platform Vertex AI interface. On the left, there's a sidebar with various options: 資訊主頁 (selected), 資料集, 功能, 標籤工作, Workbench, 管道, 訓練, 實驗, 模型, 端點, 批次預測, and 中繼資料. The main area has a banner stating "Notebooks 服務已移至 Vertex AI Workbench 服務底下。請在 Workbench 中前往「由使用者管理的筆記本」分頁找出您的 Notebooks 執行個體。". Below it is a section titled "開始使用 Vertex AI" with a sub-section "準備訓練資料" containing a "建立資料集" button. To the right is a large graphic illustrating the AI workflow with a lightbulb, a neural network, and a graph. Other sections include "訓練模型" (with a "訓練新模型" button) and "取得預測結果" (with a "建立批次預測工作" button). At the bottom left of the sidebar, there's a Marketplace link.

Deploy Imported Model by Vertex AI

客製模型部署

c. 部署模型

匯入模型

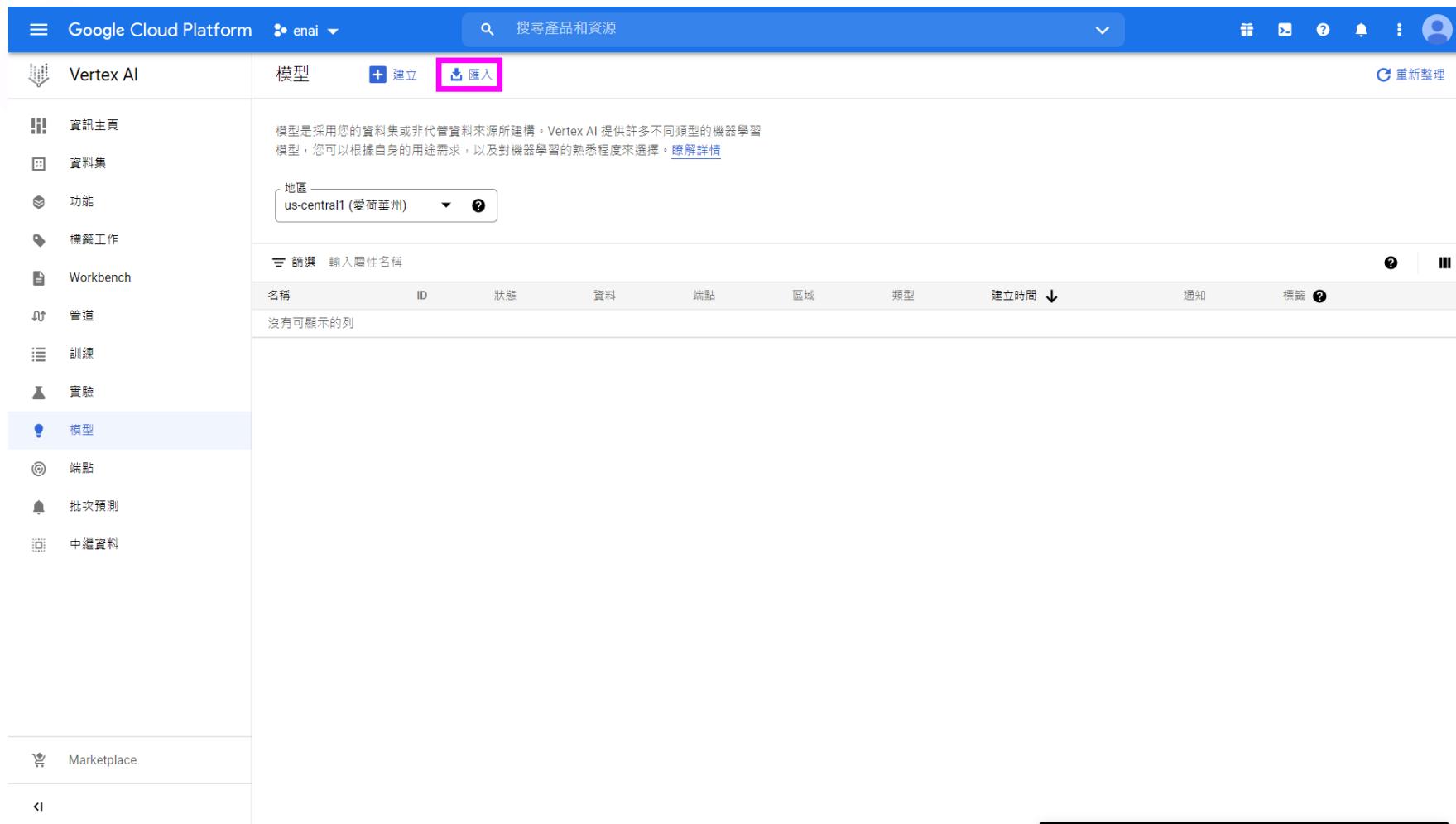
The screenshot shows the Google Cloud Platform Vertex AI console. The left sidebar menu has 'Vertex AI' selected, and the 'Model' item under it is highlighted with a pink rectangle. The main content area displays the 'Start using Vertex AI' section, which includes a note about Notebooks being moved to Vertex AI Workbench, a large central illustration of a lightbulb and data processing components, and three callout boxes: 'Prepare training data', 'Train model', and 'Get prediction results'. The 'Prepare training data' box contains a link to 'Create dataset'. The 'Train model' box contains a link to 'Create new model'. The 'Get prediction results' box contains a link to 'Create batch prediction job'. The top navigation bar shows the user's name 'enai' and a search bar.

Deploy Imported Model by Vertex AI

客製模型部署

c. 部署模型

匯入模型



The screenshot shows the Google Cloud Platform interface for Vertex AI. The left sidebar has a 'Vertex AI' section with several options: 資訊主頁, 資料集, 功能, 標籤工作, Workbench, 管道, 訓練, 實驗, 模型 (which is selected and highlighted in blue), 端點, 批次預測, and 中繼資料. Below this is a Marketplace section. The main content area is titled '模型' and features a 'Import' button highlighted with a pink box. A descriptive text block explains that models are built from datasets or raw data sources. It includes a region dropdown set to 'us-central1 (愛荷華州)' and a table header for filtering models based on name, ID, status, data, endpoint, region, type, creation time, notifications, and labels. The table body displays the message '沒有可顯示的列'.

Deploy Imported Model by Vertex AI

客製模型部署

c. 部署模型

匯入模型

The screenshot shows the Google Cloud Platform Vertex AI interface. On the left, there's a sidebar with various options like 資訊主頁, 資料集, 功能, 標籤工作, Workbench, 管道, 訓練, 實驗, 模型 (which is selected), 端點, 批次預測, 中繼資料, Marketplace, and Help. The main area has a 'Import model' button at the top right. A modal window titled 'Import model' is open, divided into three steps: 1. Name and location (with 'Model name' set to 'trees14-200'), 2. Model settings, and 3. Explainability (optional). Below the steps is an 'ADVANCED OPTIONS' section with a 'CONTINUE' button. A pink box highlights the 'Model name' input field, and another pink box highlights the 'CONTINUE' button. To the right of the modal, there's explanatory text about importing models from outside Google Cloud.

自行命名

Deploy Imported Model by Vertex AI

客製模型部署

c. 部署模型

匯入模型

Google Cloud Platform enai 搜尋產品和資源

Vertex AI 模型 建立 備入

Import model

1 名稱和地區

2 模型設定

3 可解釋性 (選用)

備入 取消

地區 — us-central1 (愛荷華州)

篩選 輸入屬性名稱

名稱 ID 狀態 資料

沒有可顯示的列

預先建構容器設定

In order to run in a pre-built container, your code needs to be in Python 3.7.

模型架構 * TensorFlow

模型版本 * 2.4

加速器類型 * 無

gs:// 模型構件位置 (Cloud Storage 路徑) *

BROWSE

備存已匯出模型檔案的 Cloud Storage 目錄路徑 (而非模型檔案本身所在位置的路徑)。依據您使用的程式庫而定，模型必須採用下列其中一個名稱：saved_model.pb、model.pkl、model.joblib 或 model.bst。

預測結構定義

選用。進一步瞭解預測結構定義

gs:// 執行個體

BROWSE

YAML 檔案的 Cloud Storage 位置，這個檔案定義了用於預測和說明要求的單一執行個體格式。

gs:// 參數

BROWSE

YAML 檔案的 Cloud Storage 位置，這個檔案定義了預測和說明參數。

gs:// 預測

BROWSE

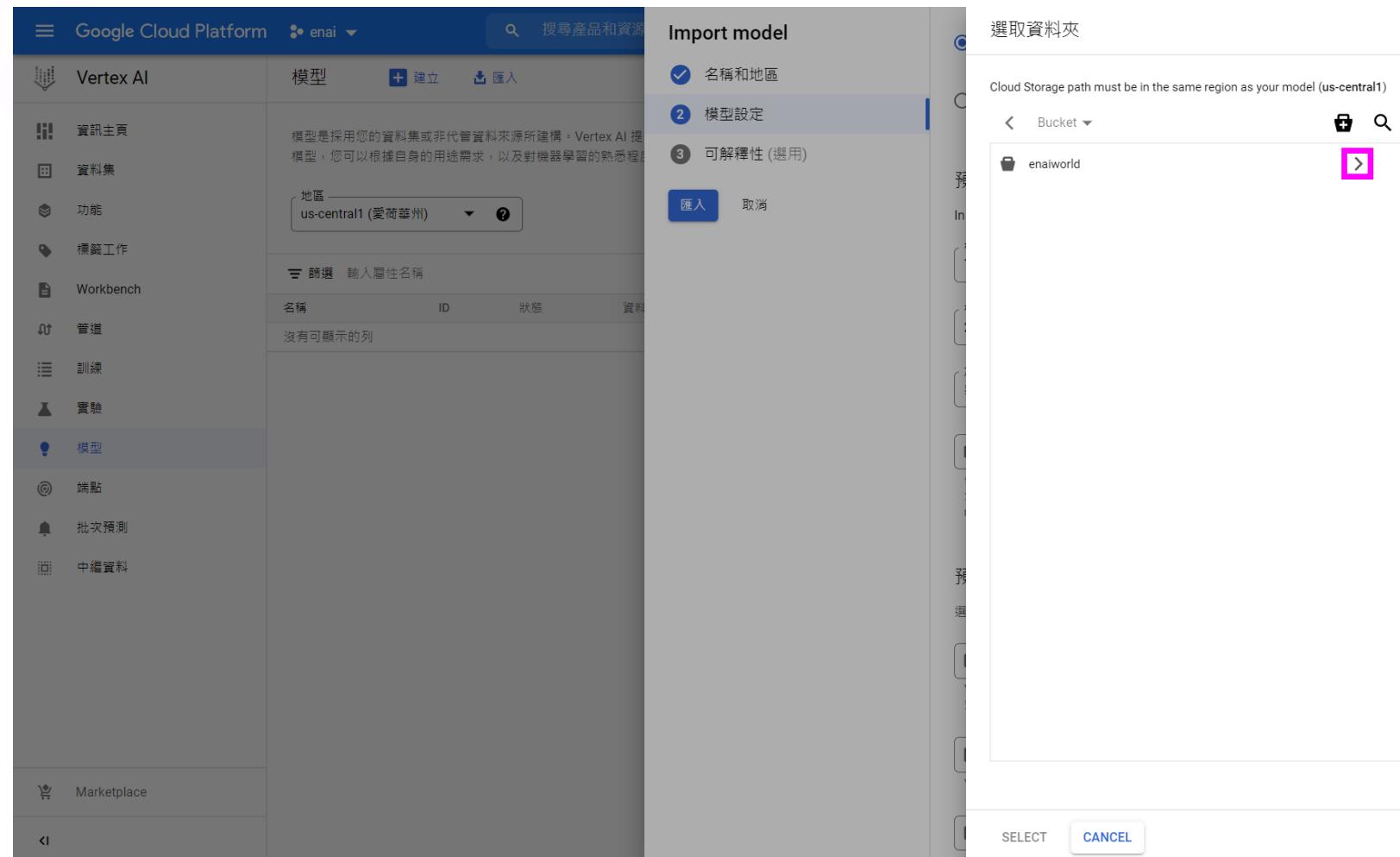
YAML 檔案的 Cloud Storage 位置，這個檔案定義了單一預測或說明的格式。

Deploy Imported Model by Vertex AI

客製模型部署

c. 部署模型

匯入模型

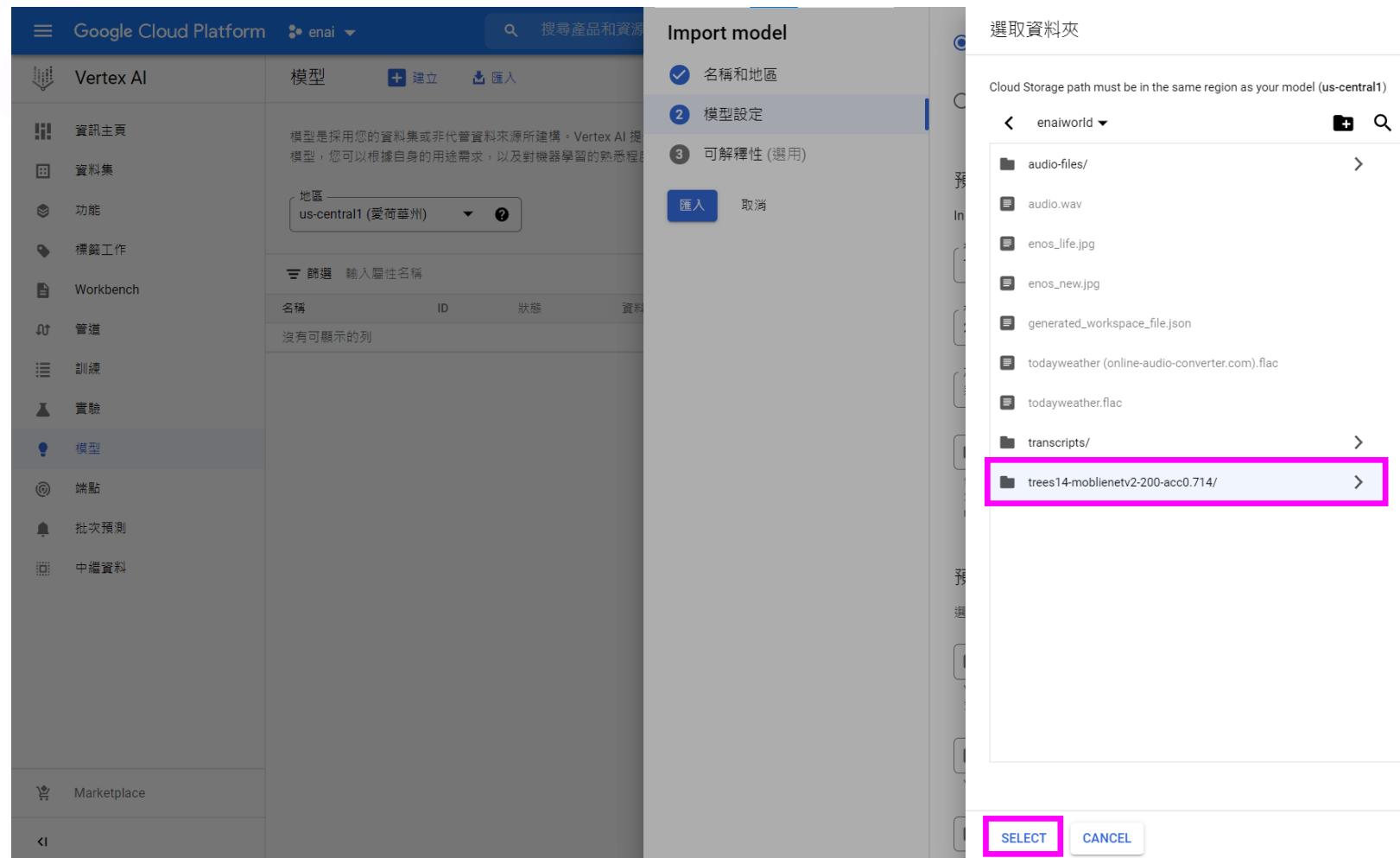


Deploy Imported Model by Vertex AI

客製模型部署

c. 部署模型

匯入模型



Deploy Imported Model by Vertex AI

客製模型部署

c. 部署模型

匯入模型

The screenshot shows the Google Cloud Platform Vertex AI interface. On the left, there's a sidebar with options like 資訊主頁, 資料集, 功能, 標籤工作, Workbench, 管道, 訓練, 實驗, 模型 (selected), 端點, 批次預測, 中繼資料, Marketplace, and Help. The main area has tabs for 模型 (+ 建立, - 傷人) and a search bar. A modal window titled "Import model" is open, showing three steps: 1. 名稱和地區 (Completed), 2. 模型設定 (Selected), and 3. 可解釋性 (選用). Step 2 has a "匯入" button highlighted with a pink box. To the right, there are two sections: "預先建構容器設定" and "預測結構定義". The "預先建構容器設定" section includes dropdowns for 模型架構 * (TensorFlow), 模型架構版本 * (2.4), 加速器類型 * (無), and a Cloud Storage path (gs:// enaiworld/trees14-mobilenetv2-200-acc0.714/). The "BROWSE" button for this path is also highlighted with a pink box. The "預測結構定義" section contains three fields: "gs:// 執行個體" (BROWSE), "gs:// 參數" (BROWSE), and "gs:// 預測" (BROWSE), each with a detailed description below it.

Import model

1. 名稱和地區

2. 模型設定

3. 可解釋性 (選用)

匯入 取消

預先建構容器設定

In order to run in a pre-built container, your code needs to be in Python 3.7

模型架構 * TensorFlow

模型架構版本 * 2.4

加速器類型 * 無

模型構件位置 (Cloud Storage 路徑) gs:// enaiworld/trees14-mobilenetv2-200-acc0.714/ BROWSE

儲存已匯出模型檔案的 Cloud Storage 目錄路徑 (而非模型檔案本身所在位置的路徑)。依據您使用的程式庫而定，模型必須採用下列其中一個名稱：saved_model.pb、model.pkl、model.joblib 或 model.bst。

預測結構定義

選用。進一步瞭解預測結構定義

gs:// 執行個體 BROWSE

YAML 檔案的 Cloud Storage 位置，這個檔案定義了用於預測和說明要求的單一執行個體格式。

gs:// 參數 BROWSE

YAML 檔案的 Cloud Storage 位置，這個檔案定義了預測和說明參數。

gs:// 預測 BROWSE

YAML 檔案的 Cloud Storage 位置，這個檔案定義了單一預測或說明的格式。

Deploy Imported Model by Vertex AI

客製模型部署

c. 部署模型

匯入模型

The screenshot shows the Google Cloud Platform Vertex AI Models interface. On the left, a sidebar menu is open under the 'Vertex AI' section, with '模型' (Models) selected. The main content area displays a table of models. One row is highlighted, showing details for a model named 'trees14-200'. The table columns include: 名稱 (Name), ID, 狀態 (Status), 資料 (Data), 端點 (Endpoint), 區域 (Region), 類型 (Type), 建立時間 (Create Time), 通知 (Notifications), and 標籤 (Labels). The 'Status' column shows a green checkmark next to '已就緒' (Ready). The 'Type' column shows '匯入' (Imported). The 'Create Time' is listed as '2021年11月16日 上午11:53:13' (November 16, 2021, 11:53:13 AM). A red text overlay at the bottom right of the table area reads '若失敗請嘗試重新匯入' (If failed, try re-importing).

Deploy Imported Model by Vertex AI

客製模型部署

c. 部署模型

調整權限

The screenshot shows the Google Cloud Platform IAM interface for the project 'enai'. The left sidebar navigation bar includes links for IAM, Identity-Aware Proxy, Roles, Audit Logs, and Asset Inventory. The main content area displays the 'enai' project's IAM roles. A search bar at the top right allows users to search for products and resources. The IAM page has tabs for 'Permissions' (selected) and 'Audit Logs'. It also includes a 'Policy Analyzer' link and a checkbox for 'Include Google-provided role grants'. The table lists the following roles:

主體	名稱	角色	操作
628452886037-compute@developer.gserviceaccount.com	Compute Engine default service account	編輯者	[Edit]
628452886037@cloudservices.gserviceaccount.com	Google API 服務代理人	編輯者	[Edit]
catchescape@gmail.com	Enos Chou	擁有者	[Edit]
gcpai-147@enai-332100.iam.gserviceaccount.com	gcpai	儲存空間物件管理員	[Edit]
service-628452886037@compute-system.iam.gserviceaccount.com	Compute Engine Service Agent	Compute Engine 服務代理人	[Edit]
service-628452886037@gcp-sa-aiplatform-cc.iam.gserviceaccount.com	AI Platform Custom Code Service Agent	Vertex AI 自訂程式碼服務代理人	[Edit]
service-628452886037@gcp-sa-aiplatform.iam.gserviceaccount.com	AI Platform Service Agent	Vertex AI 服務代理人	[Edit]

Deploy Imported Model by Vertex AI

客製模型部署

c. 部署模型

調整權限

The screenshot shows the Google Cloud Platform IAM interface for the project 'enai'. The left sidebar lists various IAM management options. The main pane displays the 'Roles' section under 'enai' project, with a table listing roles and their details. A pink box highlights the edit icon for the 'AI Platform Service Agent' role.

類型	主體	名稱	角色	安全性深入分析資訊	繼承
帳號	628452886037-compute@developer.gserviceaccount.com	Compute Engine default service account	編輯者		
帳號	628452886037@cloudservices.gserviceaccount.com	Google API 服務代理人	編輯者		
帳號	catchescape@gmail.com	Enos Chou	擁有者		
帳號	gcpai-147@enai-332100.iam.gserviceaccount.com	gcpai	儲存空間物件管理員		
帳號	service-628452886037@compute-system.iam.gserviceaccount.com	Compute Engine Service Agent	Compute Engine 服務代理人		
帳號	service-628452886037@gcp-sa-aiplatform-cc.iam.gserviceaccount.com	AI Platform Custom Code Service Agent	Vertex AI 自訂程式碼服務代理人		
帳號	service-628452886037@gcp-sa-aiplatform.iam.gserviceaccount.com	AI Platform Service Agent	Vertex AI 服務代理人		

Deploy Imported Model by Vertex AI

客製模型部署

c. 部署模型

調整權限

The screenshot shows the Google Cloud Platform (GCP) IAM & Admin interface. On the left, a sidebar menu lists various IAM-related options like IAM, Policy Analyzer, and Roles. The main panel is titled '編輯權限' (Edit Permissions) and shows a list of users and service accounts under the 'enai' project. A specific user, 'service-628452886037@gcp-sa-aiplatform.iam.gserviceaccount.com', is selected. The 'Role' dropdown is set to 'Vertex AI 服務代理人' (Vertex AI Service Agent). A button labeled '+ 新增其他角色' (Add other roles) is highlighted with a pink box. At the bottom right of the main panel, there are '儲存' (Save), '模擬' (Simulate), and '取消' (Cancel) buttons.

Deploy Imported Model by Vertex AI

客製模型部署

c. 部署模型

調整權限

The screenshot shows the Google Cloud Platform (GCP) IAM interface. On the left, the sidebar menu is open, showing various IAM-related options like IAM, Policy Analyzer, and Roles. The main panel displays the 'enai' project's IAM roles. A specific service account, 'service-628452886037@gcp-sa-aiplatform.iam.gserviceaccount.com', is selected. A modal window titled '編輯權限' (Edit Permissions) is open over the main interface. In this modal, under the '角色' (Role) dropdown, 'Vertex AI 服務代理人' (Vertex AI Service Agent) is selected. Below this, a detailed description states: '授予 Vertex AI 正常運作所需的權限。' (Grant the required permissions for Vertex AI to function normally). A dropdown menu titled '請選擇角色' (Select Role) is open, showing a list of roles. Two specific roles are highlighted with pink boxes: '服務帳戶管理員' (Service Account Manager) and '服務帳戶' (Service Account). A tooltip for '服務帳戶管理員' explains: '可建立及管理服務帳戶。' (Can create and manage service accounts). At the bottom of the modal, there is a '管理角色' (Manage Roles) link.

Deploy Imported Model by Vertex AI

客製模型部署

c. 部署模型

調整權限

The screenshot shows the Google Cloud Platform IAM & Management interface. On the left, the sidebar is collapsed. The main area displays the 'IAM' tab under the '权限' (Permissions) section. It shows a list of users and service accounts, with one account highlighted. On the right, a detailed view of the selected account's permissions is shown, titled '編輯權限' (Edit Permissions). The '主體' (Subject) is set to 'service-628452886037@gcp-sa-aiplatform.iam.gserviceaccount.com'. The '角色' (Role) is set to 'Vertex AI 服務代理人' (Vertex AI Service Agent), which is highlighted with a pink rectangle. Below it, another role, '服務帳戶管理員' (Service Account Manager), is listed. The '儲存' (Save) button at the bottom left is also highlighted with a pink rectangle.

Deploy Imported Model by Vertex AI

客製模型部署

c. 部署模型

調整權限

The screenshot shows the Google Cloud Platform IAM interface. The left sidebar is titled 'IAM 與管理' and contains the following items:

- IAM (selected)
- 身分識別與機構
- 政策疑難排解工具
- Policy Analyzer
- 機構政策
- 服務帳戶
- Workload Identity 聯盟
- 標籤
- 標記
- 設定
- 隱私權與安全性
- Identity-Aware Proxy
- 角色
- 稽核記錄
- 資產儲存庫 (最新)
- 管理資源
- 版本資訊

The main content area is titled 'enai 專案的權限' and displays a list of roles assigned to various service accounts. A purple dashed box highlights the last two entries:

類型	主體	名稱	角色	安全性深入分析資訊	繼承
帳號	628452886037-compute@developer.gserviceaccount.com	Compute Engine default service account	編輯者		
帳號	628452886037@cloudservices.gserviceaccount.com	Google API 服務代理人	編輯者		
帳號	catchescape@gmail.com	Enos Chou	擁有者		
帳號	gcpai-147@enai-332100.iam.gserviceaccount.com	gcpai	儲存空間物件管理員		
帳號	service-628452886037@compute-system.iam.gserviceaccount.com	Compute Engine Service Agent	Compute Engine 服務代理人		
帳號	service-628452886037@gcp-sa-aiplatform-cc.iam.gserviceaccount.com	AI Platform Custom Code Service Agent	Vertex AI 自訂程式碼服務代理人		
帳號	service-628452886037@gcp-sa-aiplatform.iam.gserviceaccount.com	AI Platform Service Agent	服務帳戶管理員		
帳號	service-628452886037@gcp-sa-aiplatform.iam.gserviceaccount.com	Vertex AI 服務代理人	Vertex AI 服務代理人		

Deploy Imported Model by Vertex AI

客製模型部署

c. 部署模型

部署模型至端點

The screenshot shows the Google Cloud Platform interface for Vertex AI. The left sidebar has a 'Vertex AI' section with various options: 資訊主頁, 資料集, 功能, 標籤工作, Workbench, 管道, 訓練, 實驗, 模型 (which is selected and highlighted in blue), 端點, 批次預測, and 中繼資料. Below this is a Marketplace section. The main content area is titled '模型' and shows a summary of a deployed model named 'trees14-200'. The summary includes: 地區: us-central1 (愛荷華州), 狀態: 已就緒 (Green checkmark), 資料: -, 端點: 0, 區域: us-central1, 類型: 匯入自訂訓練, 建立時間: 2021年11月16日 上午11:53:13. There is also a '重新整理' button at the top right.

名稱	ID	狀態	資料	端點	區域	類型	建立時間	通知	標籤
trees14-200	2403659961667158016	已就緒	-	0	us-central1	匯入 自訂訓練	2021年11月16日 上午11:53:13		

Deploy Imported Model by Vertex AI

客製模型部署

c. 部署模型

部署模型至端點

The screenshot shows the Google Cloud Platform Vertex AI interface. On the left, a sidebar menu lists various options: 資訊主頁, 資料集, 功能, 標籤工作, Workbench, 管道, 訓練, 實驗, 模型 (selected), 端點, 批次預測, and 中繼資料. The main content area displays information about a deployed model named 'trees14-200'. The model is listed in the 'Model' section with the following details:

名稱	ID	狀態	資料	端點	區域	類型	建立時間	通知	標籤
trees14-200	2403659961667158016	已就緒	-	0	us-central1	匯入 自訂訓練	2021年11月16日 上午11:53:13		

A context menu is open on the right side of the screen, with the option '新增至端點' highlighted in pink.

Deploy Imported Model by Vertex AI

客製模型部署

c. 部署模型

部署模型至端點

The screenshot shows the Google Cloud Platform Vertex AI interface. On the left, the sidebar menu is visible with options like 資訊主頁, 資料集, 功能, 標籤工作, Workbench, 管道, 訓練, 實驗, 模型 (selected), 端點, 批次預測, 中繼資料, 管理資源, and Marketplace.

The main panel displays a "部署至端點" (Deploy to Endpoint) dialog. It includes a summary section with a table:

名稱	ID	狀態
trees14-200	2403659961667158016	已

The dialog has three steps: 1. 定義端點 (Define Endpoint), 2. 模型設定 (Model Settings), and 3. 模型監控 (Model Monitoring). Step 1 is active, showing a "建立新端點" (Create New Endpoint) radio button selected, with the endpoint name "trees-200-end" highlighted with a pink box. The "位置" (Location) section shows "地區" (Region) set to "us-central1 (愛荷華州)".

On the right, there is a "自行命名" (Name it yourself) note above the "存取權限" (Access Control) section. This section contains two radio buttons: "標準" (Standard) and "私人" (Private). The "標準" option is selected. Below these are "進階選項" (Advanced Options) and a "繼續" (Continue) button, which is also highlighted with a pink box.

Deploy Imported Model by Vertex AI

客製模型部署 c. 部署模型

部署模型至端點

The screenshot shows the Google Cloud Platform (GCP) interface for Vertex AI. On the left, there's a sidebar with various options like 資訊主頁, 資料集, 功能, 標籤工作, Workbench, 管道, 訓練, 實驗, 模型 (selected), 端點, 批次預測, and 中繼資料. The main area is titled 'Vertex AI' and '模型'. It displays a message about building models from datasets or APIs, a region selector set to 'us-central1 (愛荷華州)', and a table with one row: '名稱' (Name) 'trees14-200', 'ID' '2403659961667158016', and '狀態' (Status) '已'. A modal window titled '部署至端點' (Deploy to Endpoint) is open, showing three steps: 1. 定義端點 (Define endpoint), 2. 模型設定 (Model settings) (selected), and 3. 模型監控 (Model monitoring). The '模型設定' tab contains fields for '模型' (Model) 'trees14-200', '流量拆分' (Traffic split) '100%', and a '部署' (Deploy) button. The right side of the modal shows '運算資源' (Compute resources) with sections for 'Autoscaling' and 'No scaling', and '指定資源調度設定之後' (After setting resource scheduling) with fields for '運算節點數量下限' (Compute node count min) '1' and '運算節點數量上限 (選項)' (Compute node count max (optional)) '2'. Below this is a '進階資源調度選項' (Advanced resource scheduling options) section with dropdown menus for '機器類型' (Machine type) 'n1-highcpu-2, 2 vCPUs, 1.8 GiB memory' and '操作系統' (Operating system) 'gcpai'.

Deploy Imported Model by Vertex AI

客製模型部署

c. 部署模型

部署模型至端點

要等

The screenshot shows the Google Cloud Platform Vertex AI interface. On the left, there's a sidebar with various options: 資訊主頁, 資料集, 功能, 標籤工作, Workbench, 管道, 訓練, 實驗, 模型 (which is selected and highlighted with a pink box), 端點 (which is also highlighted with a pink box), 批次預測, and 中繼資料. The main content area has a header with 'Google Cloud Platform' and a search bar. Below the header, there are buttons for '+ 建立' and '匯入'. The main content area displays information about a deployed model named 'trees14-200'. The table includes columns for Name, ID, Status, Data, Endpoint, Region, Type, Create Time, Notifications, and Labels. The status is '已就緒' (Ready) with a green checkmark. The endpoint count is 0. The region is 'us-central1'. The type is '匯入自訂訓練' (Imported Custom Training). The create time is '2021年11月16日上午11:53:13'. There are also dropdown menus for '地區' (Region) set to 'us-central1 (愛荷華州)' and '篩選' (Filter) set to '輸入屬性名稱' (Input Attribute Name).

Deploy Imported Model by Vertex AI

客製模型部署

c. 部署模型

部署模型至端點

要等

The screenshot shows the Google Cloud Platform interface for Vertex AI. The left sidebar has a 'Vertex AI' section with various options: 資訊主頁, 資料集, 功能, 標籤工作, Workbench, 管道, 訓練, 實驗, 模型, 端點 (which is selected and highlighted in blue), 批次預測, and 中繼資料. Below this are 管理資源 and Marketplace. The main content area is titled '端點' (Endpoints) and shows a table of deployed models. The table includes columns for Name, ID, Status, Model Type, Region, Monitoring, Last Update, API, Notifications, and Examples. One entry is visible: 'trees-200-end' with ID '7123155294221238272', Status '可用' (Available), Model Type '0', Region 'us-central1', Monitoring '已停用' (Disabled), Last Update '2021年11月16日 下午2:03:52', and API '要求範例' (Request Example). A '建立端點' (Create Endpoint) button is located at the top right of the main content area.

	名稱	ID	狀態	模型	區域	監控	最新快報	上次更新時間	API	通知	標籤
<input type="checkbox"/>	trees-200-end	7123155294221238272	可用	0	us-central1	已停用	-	2021年11月16日 下午2:03:52	要求範例		

Deploy Imported Model by Vertex AI

客製模型部署

c. 部署模型

部署模型至端點

目錄錯誤

發生錯誤，因此無法建立端點「trees14-end」：
APPLICATION_ERROR:google.cloud.ml.v1/ModelService.CreateVersion;Field:
version.deployment_uri Error: Deployment
directory gs://caip-tenant-722bd1ee-863c-4563-
8bc5-
9539055000c0/3360397805553188864/artifacts/ is expected to contain exactly one of:
[saved_model.pb,
saved_model.pbtxt].;AppErrorCode=9;StartTime
Ms=1629461183768;unknown;ResFormat=AUT
OMATIC;ServerTimeSec=0.516384575;LogByte
s=256;Non-
FailFast;EffSecLevel=none;ReqFormat=AUTOM
ATIC;ReqID=25fc6c68ed78f2fc;GlobalID=0;Serv
er=[2002:a5e:2803:0:b0:15e:3f28:d5a0]:4002。

您要求執行的操作失敗，請再試一次。

提供意見 關閉

嘗試調整模型構件位置

Deploy Imported Model by Vertex AI

客製模型部署

c. 部署模型

部署模型至端點

權限不足

發生錯誤，因此無法建立端點「trees14-200-end」：Failed to add IAM policy binding. Please grant service-127799810300@gcp-sa-aiplatform.iam.gserviceaccount.com the iam.serviceAccountAdmin role on service account gcpai-438@enai-323212.iam.gserviceaccount.com.。

您要求執行的操作失敗，請再試一次。

[提供意見](#) [關閉](#)

嘗試調整權限

Deploy Imported Model by Vertex AI

客製模型部署 d. 叫用模型

UI 叫用模型

The screenshot shows the Google Cloud Platform Vertex AI interface. On the left, there is a sidebar with the following menu items:

- 資訊主頁
- 資料集
- 功能
- 標籤工作
- Workbench
- 管道
- 訓練
- 實驗
- 模型** (highlighted with a red box)
- 端點
- 批次預測
- 中繼資料

The main content area is titled "端點" (Endpoints) and includes a "建立端點" (Create Endpoint) button. Below this is a detailed description of what endpoints are used for. A dropdown menu for "地區" (Region) is set to "us-central1 (愛荷華州)". There is also a "篩選 輸入屬性名稱" (Filter Input Attribute Name) input field.

	名稱	ID	狀態	模型	區域	監控	最新快訊	上次更新時間	API	通知	標籤
<input type="checkbox"/>	trees-200-end	7123155294221238272	可用	0	us-central1	已停用	-	2021年11月16日 下午2:03:52	要求範例		

Deploy Imported Model by Vertex AI

客製模型部署 d. 叫用模型

UI 叫用模型

The screenshot shows the Google Cloud Platform interface for Vertex AI. The left sidebar has a 'Vertex AI' section with various options: 資訊主頁, 資料集, 功能, 標籤工作, Workbench, 管道, 訓練, 實驗, 模型 (which is selected and highlighted in blue), 端點, 批次預測, and 中繼資料. Below this are '管理資源' and 'Marketplace'. The main content area is titled '模型' and shows a summary of the imported model 'trees14-200'. The summary includes: 地區: us-central1 (愛荷華州), 狀態: 已就緒 (with a green checkmark), 資料: -, 端點: 1 SHOW ENDPOINTS, 區域: us-central1, 類型: 匯入自訂訓練, 建立時間: 2021年11月16日 上午11:53:13. There is also a '建立' (Create) button and a '匯入' (Import) button.

名稱	ID	狀態	資料	端點	區域	類型	建立時間	通知	標籤
trees14-200	2403659961667158016	已就緒	-	1 SHOW ENDPOINTS	us-central1	匯入 自訂訓練	2021年11月16日 上午11:53:13		

Deploy Imported Model by Vertex AI

客製模型部署 d. 叫用模型

UI 叫用模型

The screenshot shows the Google Cloud Platform (GCP) interface for Vertex AI. The left sidebar navigation bar includes options like Vertex AI, 資訊主頁, 資料集, 功能, 標籤工作, Workbench, 管道, 訓練, 實驗, 模型 (highlighted), 端點, 批次預測, and 中繼資料. The main content area is titled "Deploy your model" and describes endpoints as machine learning models available for online prediction requests. It shows a table of deployed models:

名稱	ID	狀態	模型	區域	監控	最近期的監控工作	最新快訊	上次更新時間	API	通知	標籤	加密方式
trees-200-end	7123155294221238272	可用	1	us-central1	已停用	-	-	2021年11月16日 下午2:16:37	要求範例	Google 代管的金鑰		

Below the table, there's a "測試模型" (Test Model) section with a "預覽" (Preview) button. A JSON request example is shown in a pink-bordered box:

```
{  
  "instances": [  
    {  
      "sample_key": "sample_value"  
    }  
  ]  
}
```

A "預測" (Predict) button is at the bottom left, and a "回應" (Response) box is on the right.

Deploy Imported Model by Vertex AI

客製模型部署

d. 叫用模型

UI 叫用模型

```
import json
import numpy as np
from PIL import Image
```

```
CAT = ['榕樹', '白千層', '楓香', '台灣欒樹',
       '小葉欒仁', '大葉欒仁', '茄冬', '黑板樹', '大王椰子', '鳳凰木',
       '阿勃勒', '水黃皮', '樟樹', '苦棟']
```

```
def preprocess_image(f, res=200):
    img = Image.open(f)
    img = img.resize((res, res))
    data = np.array(img.getdata())
    img = data.reshape(1, *img.size, 3)
    img = img.astype('float32')
    img /= 255.

    return img
```

Deploy Imported Model by Vertex AI

客製模型部署

d. 叫用模型

UI 叫用模型

```
def dump_image(img):
    d = {'instances': img.tolist()}
    print(json.dumps(d))
```

```
YOUR_PIC = 'tm.jpg'

img = preprocess_image(YOUR_PIC)
dump_image(img)
```

Deploy Imported Model by Vertex AI

客製模型部署 d. 叫用模型

UI 叫用模型

將程式產出 list 貼至此

The screenshot shows the Google Cloud Platform Vertex AI interface. On the left, there is a sidebar with various options: 資訊主頁, 資料集, 功能, 標籤工作, Workbench, 管道, 訓練, 實驗, 模型 (which is highlighted), 端點, 批次預測, and 中繼資料. The main content area has a blue header bar with the title 'trees14-200' and a '匯出' button. Below the header, there are three tabs: 部署及測試 (selected), 批次預測, and 模型屬性. A sub-section titled 'Deploy your model' explains what endpoints are and how they can be used for online predictions. It shows a table with one row for the endpoint 'trees-200-end'. The table columns include Name, ID, Status, Model, Region, Monitoring, Last Monitoring Work, Latest Update, API, Notifications, Labels, and Encryption. The endpoint details are: Name: trees-200-end, ID: 7123155294221238272, Status: 可用 (Available), Model: 1, Region: us-central1, Monitoring: 已停用 (Monitoring disabled). The latest update was on 2021年11月16日下午2:16:37. The 'API' column shows '要求範例' (Request example) and 'Google 代管的金鑰' (Google-managed key). At the bottom, there is a '預覽' (Preview) section for JSON requests, which contains a large block of JSON code. A pink box highlights this JSON code.

名稱	ID	狀態	模型	區域	監控	最近期的監控工作	最新快訊	上次更新時間	API	通知	標籤	加密方式
trees-200-end	7123155294221238272	可用	1	us-central1	已停用	-	-	2021年11月16日 下午2:16:37	要求範例	Google 代管的金鑰		

JSON 要求

```
[{"instances": [{"x": 0.8470588326454163, "y": 0.8549019694328308, "z": 0.8313725590705872}, {"x": 0.8352941274642944, "y": 0.8392156958580017, "z": 0.8196078538894653}, {"x": 0.8274509906768799, "y": 0.8352941274642944, "z": 0.8117647171020588}, {"x": 0.8274509906768799, "y": 0.80878431487083435, "z": 0.8274509906768799}, {"x": 0.8235294222831726, "y": 0.8235294222831726, "z": 0.8156862854957581}]]}
```

回應

Deploy Imported Model by Vertex AI

客製模型部署 d. 叫用模型

UI 叫用模型

The screenshot shows the Google Cloud Platform (GCP) interface for Vertex AI. The left sidebar navigation bar includes options like Vertex AI, 資訊主頁, 資料集, 功能, 標籤工作, Workbench, 管道, 訓練, 實驗, 模型 (selected), 端點, 批次預測, and 中繼資料.

The main content area displays the "Deploy your model" section. It shows a table of deployed endpoints:

名稱	ID	狀態	模型	區域	監控	最近期的監控工作	最新快訊	上次更新時間	API	通知	標籤	加密方式
trees-200-end	7123155294221238272	可用	1	us-central1	已停用	-	-	2021年11月16日 下午2:16:37	要求範例	Google 代管的金 鑰		

Below the table, there's a "Test Model" section with a JSON input field and a "Predict" button. The JSON input field contains a list of numerical values, and the "Predict" button is highlighted in blue. To the right, a "Response" section shows a JSON object with a "predictions" key containing a list of values.

Deploy Imported Model by Vertex AI

客製模型部署

d. 叫用模型

套件 Google Cloud AI Platform

```
pip install google-cloud-aiplatform --upgrade
```

grpcio 版本衝突 (不影響測試)

google-cloud-bigquery 2.24.0 要求 grpcio 1.38.1 以上，但 TensorFlow 2.4.3 要求
grpcio 1.32.0

Deploy Imported Model by Vertex AI

客製模型部署

d. 叫用模型

```
import os  
  
import numpy as np  
from PIL import Image  
from google.cloud import aiplatform
```

```
YOUR_PROJECT = 'YOUR_PROJECT_ID'  
YOUR_LOCATION = 'YOUR_LOCATION'  
YOUR_ENDPOINT = 'YOUR_ENDPOINT_ID'  
YOUR_SERVICE = 'YOUR_SERVICE'  
YOUR_PIC = 'tm.jpg'  
CAT = ['榕樹', '白千層', '楓香', '台灣  
欒樹', '小葉欒仁', '大葉欒仁', '茄冬',  
'黑板樹', '大王椰子', '鳳凰木', '阿勃  
勒', '水黃皮', '樟樹', '苦棟']
```

Deploy Imported Model by Vertex AI

客製模型部署 d. 叫用模型

The screenshot shows the Google Cloud Platform (GCP) interface for Vertex AI. The left sidebar navigation bar includes options like Vertex AI, 資訊主頁, 資料集, 功能, 標籤工作, Workbench, 管道, 訓練, 實驗, 模型 (selected), 端點, 批次預測, and 中繼資料. The main content area is titled "Deploy your model" and describes Endpoints as machine learning models available for online prediction requests. It shows a table for deploying to endpoints:

名稱	ID	狀態	模型	區域	監控	最近期的監控工作	最新快訊	上次更新時間	API	通知	標籤	加密方式
trees-200-end	7123155294221238272	可用	1	us-central1	已停用	-	-	2021年11月16日 下午2:16:37	要求範例	Google 代管的金 鑽		

Below the table, there's a "TEST MODEL" section with JSON requirements and a response pane.

JSON 要求:

```
[[{"x": 0.8470588326454163, "y": 0.8549019694328308, "z": 0.8313725590705872}, {"x": 0.8352941274642944, "y": 0.8392156958580017, "z": 0.8196078538894653}, {"x": 0.8274509906768799, "y": 0.8352941274642944, "z": 0.8117647171020588}, {"x": 0.8274509906768799, "y": 0.8352941274642944, "z": 0.8196078538894653}, {"x": 0.8274509906768799, "y": 0.8078431487083435, "z": 0.823529422831726}, {"x": 0.823529422831726, "y": 0.823529422831726, "z": 0.8156862854957581}]]
```

回應:

```
{"predictions": [0.000693103764, 0.0000385271087, 0.00382365333, 0.000321143627, 0.993731081, 0.0000807420729, 0.0000773773791, 0.0000444441357]}
```

Deploy Imported Model by Vertex AI

客製模型部署

d. 叫用模型

```
def preprocess_image(f, res=200):
    img = Image.open(f)
    img = img.resize((res, res))
    data = np.array(img.getdata())
    img = data.reshape(1, *img.size, 3)
    img = img.astype('float32')
    img /= 255.

    return img
```

Deploy Imported Model by Vertex AI

客製模型部署

d. 叫用模型

```
os.environ['GOOGLE_APPLICATION_CREDENTIALS'] = YOUR_SERVICE  
aiplatform.init(project=YOUR_PROJECT, location=YOUR_LOCATION)  
endpoint = aiplatform.Endpoint(YOUR_ENDPOINT)  
img = preprocess_image(YOUR_PIC) # img shape (1, 200, 200, 3)  
prediction = endpoint.predict(instances=img.tolist()) # instances < 1.5M  
print(CAT[np.argmax(prediction.predictions)])
```

Deploy Imported Model by Vertex AI

客製模型部署 d. 叫用模型

調整服務帳戶角色



The screenshot shows the Google Cloud Platform IAM interface. The left sidebar is titled 'IAM 與管理' and includes options like 'IAM', '身分識別與機構', '政策疑難排解工具', 'Policy Analyzer', '機構政策', '服務帳戶', 'Workload Identity 聯盟', '標籤', '標記', '設定', '隱私權與安全性', 'Identity-Aware Proxy', '角色', '稽核記錄', '資產儲存庫', '管理資源', and '版本資訊'. The main content area is titled 'enai 專案的權限' and shows a table of roles:

類型	主體	名稱	角色	安全性深入分析資訊	繼承
<input type="checkbox"/>	628452886037-compute@developer.gserviceaccount.com	Compute Engine default service account	編輯者	瞭解詳情	
<input type="checkbox"/>	628452886037@cloudservices.gserviceaccount.com	Google API 服務代理人	編輯者	瞭解詳情	
<input type="checkbox"/>	catchescape@gmail.com	Enos Chou	擁有者		
<input type="checkbox"/>	gcpai-147@enai-332100.iam.gserviceaccount.com	gcpai	儲存空間物件管理員		

Deploy Imported Model by Vertex AI

客製模型部署 d. 叫用模型

調整服務帳戶角色

The screenshot shows the Google Cloud Platform IAM interface. On the left, a sidebar lists various IAM-related options like IAM, Identity-Aware Proxy, and Roles. The main panel displays the 'enai' project's IAM roles. A specific role entry for 'gcpal-147@enai-332100.iam.gserviceaccount.com' is selected, showing it has the 'Storage Object Admin' role assigned with full control over GCS objects. A pink box highlights the '+ Add another role' button at the bottom of the list.

Google Cloud Platform enai 搜尋產品和資源

IAM 新增 移除

IAM 權限 建議歷史記錄

「enai」專案的權限

這些權限會影響這項專案及其所有資源。[瞭解詳情](#)

檢視方式： 主體 角色

篩選 輸入屬性名稱或值

類型	主體 ↑
郵件	628452886037-compute@developer.gserviceaccount.com
郵件	628452886037@cloudservices.gserviceaccount.com
郵件	catchescape@gmail.com
郵件	gcpal-147@enai-332100.iam.gserviceaccount.com

編輯權限

主體 專案

gcpal-147@enai-332100.iam.gserviceaccount.com enai

角色 **儲存空間物件管理員**

條件 [新增條件](#)

+ 新增其他角色

儲存 模擬 取消

Deploy Imported Model by Vertex AI

客製模型部署 d. 叫用模型

調整服務帳戶角色

The screenshot shows the Google Cloud Platform IAM interface. On the left, the sidebar is collapsed. The main area displays the 'IAM' section under 'IAM 與管理'. The '權限' tab is selected, showing the title '「enai」專案的權限' and a note about impacting the project and its resources. Below this, there are tabs for '檢視方式' (View mode) with '主體' (Subject) selected and '角色' (Role) available. A search bar is present above a list of subjects. The list includes several service accounts and a user email. On the right, a detailed view for 'gcpal-147@enai-332100.iam.gserviceaccount.com' is shown under the 'enai' project. The '角色' dropdown is set to '儲存空間物件管理員' (Storage Object Admin), which is highlighted with a pink rectangle. Below it, another dropdown is set to 'Vertex AI 使用者' (Vertex AI User), also highlighted with a pink rectangle. The '條件' (Conditions) section is visible. At the bottom, there are buttons for '儲存' (Save), '模擬' (Simulate), and '取消' (Cancel).

Deploy Imported Model by Vertex AI

客製模型部署 d. 叫用模型

調整服務帳戶角色

The screenshot shows the Google Cloud Platform (GCP) IAM & Admin interface. The left sidebar is titled 'IAM 與管理' and contains the following menu items:

- IAM (selected)
- 身分識別與機構
- 政策疑難排解工具
- Policy Analyzer
- 機構政策
- 服務帳戶
- Workload Identity 聯盟
- 標籤
- 標記
- 設定
- 隱私權與安全性
- Identity-Aware Proxy
- 角色
- 稽核記錄
- 資產儲存庫 (最新)
- 管理資源
- 版本資訊

The main content area is titled 'enai 專案的權限' and displays the '權限' tab. It shows a list of service accounts and their assigned roles:

類型	主體	名稱	角色	安全性深入分析資訊	繼承
服務帳戶	628452886037-compute@developer.gserviceaccount.com	Compute Engine default service account	編輯者		
服務帳戶	628452886037@cloudservices.gserviceaccount.com	Google API 服務代理人	編輯者		
電子郵件	catchescape@gmail.com	Enos Chou	擁有者		
服務帳戶	gcpai-147@enai-332100.iam.gserviceaccount.com	gcpai	儲存空間物件管理員		
			Vertex AI 使用者		

Deploy Imported Model by Vertex AI

客製模型部署

d. 叫用模型

error

PermissionDenied: 403 Permission 'aiplatform.endpoints.get' denied on resource '`//aiplatform.googleapis.com/projects/YOUR_PROJECT_ID/locations/YOUR_LOCATION/endpoints/YOUR_ENDPOINT_ID`' (or it may not exist).

solution

設定服務帳號角色，或確認所有 ID 正確性

Deploy Imported Model by Vertex AI

客製模型部署

d. 叫用模型

error

DefaultCredentialsError: Could not automatically determine credentials.
Please set GOOGLE_APPLICATION_CREDENTIALS or explicitly create credentials
and re-run the application. For more information, please see
<https://cloud.google.com/docs/authentication/getting-started>

solution

```
os.environ['GOOGLE_APPLICATION_CREDENTIALS'] = YOUR_SERVICE
```

Deploy Imported Model by Vertex AI

客製模型部署

d. 叫用模型

error

PermissionDenied: 403 This API method requires billing to be enabled.
Please enable billing on project YOUR_PROJECT_ID by visiting
https://console.developers.google.com/billing/enable?project=YOUR_PROJECT_ID then retry. If you enabled billing for this project recently, wait a few minutes for the action to propagate to our systems and retry.

solution

確認 project id 正確，並確認該帳號已啟動正式計費或處於試用階段

Your Turn - Deploy Your Own Model

建立手寫數字辨識模型 (MNIST) 並部署至 Vertex AI，完成驗證
(45 mins)

Hint:

也可以部署任何自己建立的模型



Low-Code AI Training to Serving on GCP

AutoML
AutoML Edge

AutoML by Vertex AI

價格

<https://cloud.google.com/vertex-ai/> > 定價 > 總價費率

AutoML

雲端建模雲端服務

- a. 上傳資料
- b. 訓練模型
- c. 部署模型
- d. 叫用模型

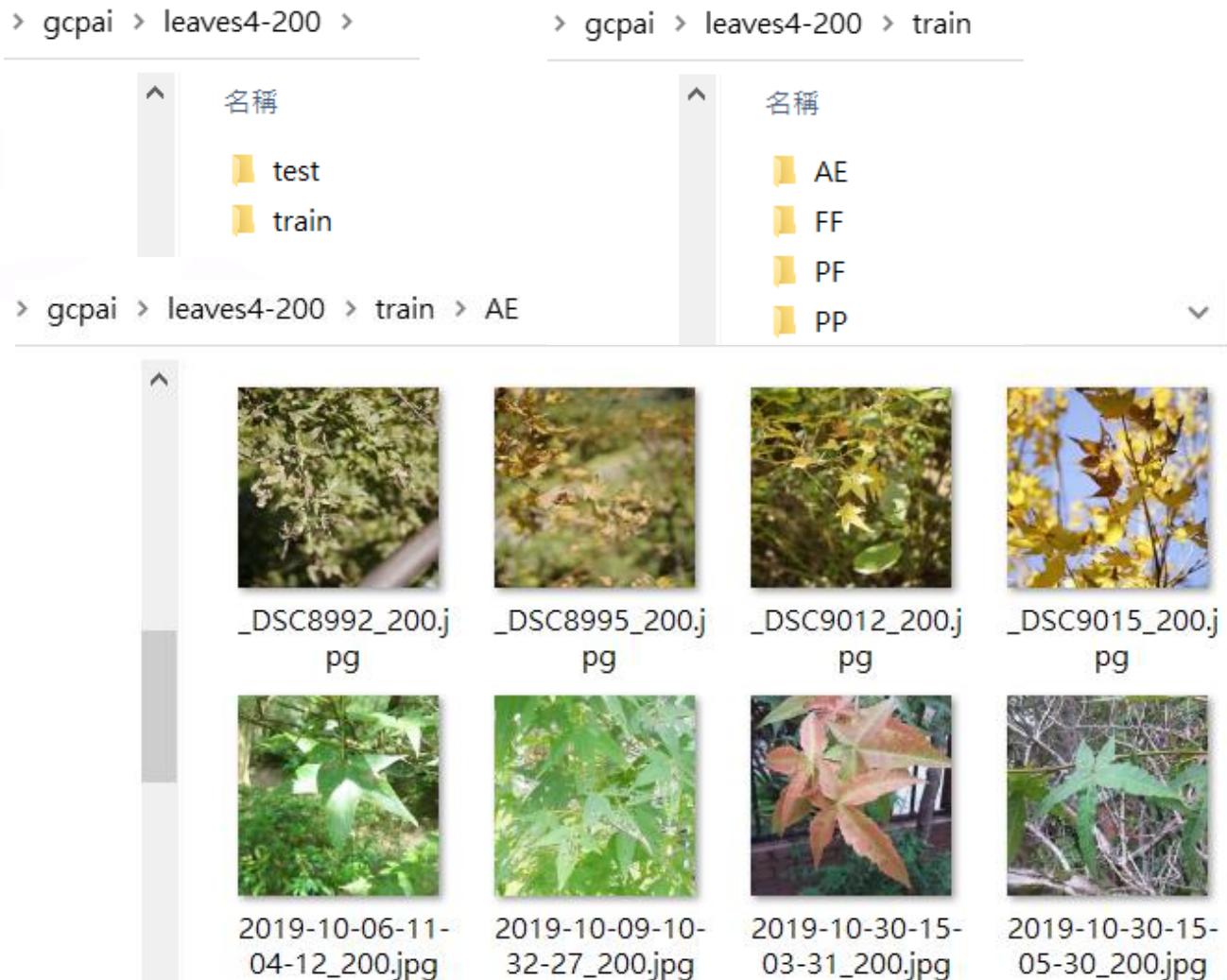
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雲端建模雲端服務

a. 上傳資料

檢視資料集 leaves4-200

unzip leaves4-200.zip



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雲端建模雲端服務

a. 上傳資料

local to GCS

The screenshot shows the Google Cloud Platform Cloud Storage interface. The left sidebar has 'Cloud Storage' selected. The main area shows a bucket named 'enaiworld'. The 'enaiworld' page includes details like location (us-central1), storage class (Standard), and access control (ACL). Below this is a table of objects in the bucket, with the 'Upload Folders' tab highlighted. The table lists various files and folders, including 'audio-files/' and 'trees14-mobilenetv2-200-acc0.714.'. The bottom navigation bar includes links for Marketplace and Version History.

名稱	大小	類型	建立時間	儲存空間級別	上次修改日期	公開存取權	版本記錄	加密	保留到期
audio-files/	-	資料夾	-	-	-	-	-	-	-
audio.wav	860 KB	audio/wav	2021年11...	Standard	2021年11...	非公開	-	Google-managed key	-
enos_life.jpg	228.3 KB	image/jpeg	2021年11...	Standard	2021年11...	非公開	-	Google-managed key	-
enos_new.jpg	250.3 KB	image/jpeg	2021年11...	Standard	2021年11...	非公開	-	Google-managed key	-
generated_workspace_file.json	1 KB	text/plain	2021年11...	Standard	2021年11...	非公開	-	Google-managed key	-
todayweather (online-audio-convert)	540.7 KB	audio/x-flac	2021年11...	Standard	2021年11...	非公開	-	Google-managed key	-
todayweather.flac	540.7 KB	audio/x-flac	2021年11...	Standard	2021年11...	非公開	-	Google-managed key	-
transcripts/	-	資料夾	-	-	-	-	-	-	-
trees14-mobilenetv2-200-acc0.714.	-	資料夾	-	-	-	-	-	-	-

AutoML

雲端建模雲端服務

a. 上傳資料

local to GCS

The screenshot shows the Google Cloud Platform Cloud Storage interface for the 'enaiworld' bucket. A modal dialog box is open, asking if the user wants to upload 500 files from 'leaves4-200'. The 'Upload' button is highlighted with a pink rectangle. The main interface shows a list of files including audio-files/, audio.wav, enos_life.jpg, enos_new.jpg, generated_workspace_file.json, todayweather (online-audio-convert), todayweather.flac, transcripts/, and trees14-mobilenetv2-200-acc0.714. The 'Upload' tab is selected in the navigation bar.

名稱	大小	類型	建立時間	儲存空間級別	上次修改日期	公開存取權	版本記錄	加密	保留到期
audio-files/	-	資料夾	-	-	-	-	-	-	-
audio.wav	860 KB	audio/wav	2021年11...	Standard	2021年11...	非公開	-	Google-managed key	-
enos_life.jpg	228.3 KB	image/jpeg	2021年11...	Standard	2021年11...	非公開	-	Google-managed key	-
enos_new.jpg	250.3 KB	image/jpeg	2021年11...	Standard	2021年11...	非公開	-	Google-managed key	-
generated_workspace_file.json	1 KB	text/plain	2021年11...	Standard	2021年11...	非公開	-	Google-managed key	-
todayweather (online-audio-convert)	540.7 KB	audio/x-flac	2021年11...	Standard	2021年11...	非公開	-	Google-managed key	-
todayweather.flac	540.7 KB	audio/x-flac	2021年11...	Standard	2021年11...	非公開	-	Google-managed key	-
transcripts/	-	資料夾	-	-	-	-	-	-	-
trees14-mobilenetv2-200-acc0.714.	-	資料夾	-	-	-	-	-	-	-

AutoML

雲端建模雲端服務

a. 上傳資料

local to GCS

約 2 分

The screenshot shows the Google Cloud Platform Cloud Storage interface for the bucket 'enaiworld'. The left sidebar includes links for 'Cloud Storage', 'Marketplace', and '版本資訊'. The main area displays the contents of the 'enaiworld' bucket, which contains several files and folders. A file named 'leaves4-200/' is highlighted with a pink box. The right side features a 'Upload and "enai"作业' (Upload and "enai" task) panel with a list of four completed uploads:

檔案	狀態
2019-11-09-12-48-10_200.jpg	完成
2019-11-09-12-57-48_200.jpg	完成
2019-11-09-13-08-09_200.jpg	完成
2019-11-09-13-30-31_200.jpg	完成

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雲端建模雲端服務

a. 上傳資料

準備標註檔

training, gs://enaiworld/leaves4-200/train/FF/IMG_1842_200.JPG, FF

test, gs://enaiworld/leaves4-200/test/FF/IMG_4946_200.JPG, FF

validation, gs://enaiworld/leaves4-200/test/FF/IMG_4946_200.JPG, FF

↑
(選用) 資料用途

↑
資料位置

↑
(選用) Label

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a. 上傳資料

準備標註檔

```
import os
from glob import glob

YOUR_BUCKET = 'YOUR_BUCKET'
CAT = ['AE', 'FF', 'PF', 'PP'] # 青楓, 水同木, 大葉山欓, 盾柱木
TRAIN_PATH = 'leaves4-200/train'
TEST_PATH = 'leaves4-200/test'
ANNO = 'leaves4-200-anno.csv'
GCS = f'gs://{{YOUR_BUCKET}}/leaves4-200'
```

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雲端建模雲端服務

a. 上傳資料

準備標註檔

```
def anno(of, cats, path, tg, mode='w'):
    TG2DIR = {'training': 'train',
              'test': 'test',
              'validation': 'test'}
    if not tg in TG2DIR:
        return
    d = TG2DIR[tg]
```

```
    o = open(of, mode)
    for c in cats:
        x = os.path.join(path, c, '*.[jJ][pP]')
        for f in glob(x):
            b = os.path.basename(f)
            blob = '/'.join([GCS, d, c, b])
            o.write(f'{tg}, {blob}, {c}\n')
    o.close()
```

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雲端建模雲端服務

a. 上傳資料

準備標註檔

```
anno(of=ANNO, cats=CAT, path=TRAIN_PATH, tg='training')  
anno(of=ANNO, cats=CAT, path=TEST_PATH, tg='test', mode='a')
```

AutoML

雲端建模雲端服務

a. 上傳資料

GCS to Vertex AI

The screenshot shows the Google Cloud Platform Vertex AI interface. The left sidebar menu includes options like 資訊主頁, 資料集 (highlighted with a pink box), 功能, 標籤工作, Workbench, 管道, 訓練, 實驗, 模型, 端點, 批次預測, 中繼資料, Marketplace, and Help. The main content area is titled '資料集' and shows a summary: '代管資料集內包含用來訓練機器學習模型的資料。' (Managed datasets contain data used to train machine learning models.) with a '瞭解詳情' (Learn more) link. A dropdown for '地區' (Region) is set to 'us-central1 (愛荷華州)'. Below this is a table header for '篩選 輸入屬性名稱' (Filter Input attribute name) with columns: 名稱 (Name), ID, 狀態 (Status), 區域 (Region), 類型 (Type), 項目數 (Number of items), 上次更新時間 (Last updated time), and 標籤 (Labels). A note below the table says '沒有可顯示的結果' (No results to display). In the center, there's a stylized globe icon with colored dots (yellow, green, blue, red) representing data points. At the bottom, a message says '您尚未在這個專案中建立任何資料集' (You have not created any datasets in this project yet) and a blue button labeled '建立資料集' (Create dataset).

AutoML

雲端建模雲端服務

a. 上傳資料

GCS to Vertex AI

The screenshot shows the Google Cloud Platform Vertex AI interface. The left sidebar menu includes options like 資訊主頁, 資料集 (selected), 功能, 標籤工作, Workbench, 管道, 訓練, 實驗, 模型, 端點, 批次預測, and 中繼資料. The main content area is titled '建立資料集' and shows a dataset named 'leaves4-200'. It provides options for selecting data types and targets, including '圖片' (Image), '表格型' (Table), '文字' (Text), and '影片' (Video). Four target types are shown: '圖片分類 (單一標籤)' (Image Classification (Single Label)), '圖片分類 (多標籤)' (Image Classification (Multi-label)), '圖片物件偵測' (Image Object Detection), and '圖片區隔' (Image Segmentation). The '圖片' tab is selected. A dropdown for '地區' (Region) is set to 'us-central1 (愛荷華州)'. At the bottom, there's an 'ADVANCED OPTIONS' section and a note about creating a annotation dataset. Buttons for '建立' (Create) and '取消' (Cancel) are at the bottom right.

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雲端建模雲端服務

a. 上傳資料

GCS to Vertex AI

約 1 分

The screenshot shows the Google Cloud Platform Vertex AI interface. The left sidebar menu is visible with options like 資訊主頁, 資料集 (selected), 功能, 標籤工作, Workbench, 管道, 訓練, 實驗, 模型, 端點, 批次預測, and 中繼資料. The main content area has a blue header bar with the title 'leaves4-200' and a dropdown menu 'leaves4-200_icn'. Below the header are tabs for '匯入' (Import), '瀏覽' (Browse), and '分析' (Analyze). A sub-section titled '將圖片新增至資料集' (Add image to dataset) provides instructions and a list of import methods: '上傳映像檔' (Upload image file), '匯入檔案' (Import file), and '從 Cloud Storage 選取匯入檔案' (Select import from Cloud Storage). It also includes a note about uploading up to 500 images at once. To the right, there is a preview image of a blue sky with clouds and three labeled types: CUMULUS, CIRRUS, and STRATUS. Below the preview, text explains that the image classification model can predict multiple labels and suggests using the Google Vision API for general object detection.

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雲端建模雲端服務

a. 上傳資料

GCS to Vertex AI

Google Cloud Platform enai 搜尋產品和資源

Vertex AI leaves4-200 leaves4-200_icn

資料集

匯入 瀏覽 分析

將圖片新增至資料集
在開始之前，請先參閱[資料指南](#)來瞭解如何準備資料，然後選擇匯入方法。

選取匯入方法

- 上傳映像檔：如果您仍未建立標籤，建議採取這項做法
- 匯入檔案：如果您已有標籤，建議採取這項做法。匯入檔案為映像檔與選用資料(例如標籤)的Cloud Storage URI清單。[瞭解如何建立匯入檔案](#)

從電腦上傳圖片
 從電腦上傳匯入檔案
 從Cloud Storage選取匯入檔案

從電腦上傳匯入檔案
匯入檔案中參照的圖片會經過預先處理，並儲存於新的Cloud Storage值區。

選取檔案

CLOUD CUMULUS CIRRUS STRATUS

圖片分類模型會預測圖片的一或多個標籤，例如識別天空圖片中的雲朵類型。
與其建立自訂模型，您不妨使用Google的Vision API來偵測一般物件、臉孔和文字。[瞭解詳情](#)

AutoML

雲端建模雲端服務

a. 上傳資料

GCS to Vertex AI

The screenshot shows the Google Cloud Platform (GCP) interface for Vertex AI. The left sidebar menu is visible, with '資料集' (Dataset) selected. The main content area is titled 'leaves4-200' and shows the '匯入' (Import) tab selected. A sub-section titled '將圖片新增至資料集' (Add image to dataset) provides instructions to prepare data before importing. Below this, '選取匯入方法' (Select import method) offers three options: '上傳映像檔' (Upload image file), '匯入檔案' (Import file), and '從 Cloud Storage 選取匯入檔案' (Select import from Cloud Storage). The '從電腦上傳匯入檔案' (Import file from computer) option is selected. A preview window displays a blue sky with clouds and labels 'CUMULUS', 'CIRRUS', and 'STRATUS'. A note below states that image classification models predict multiple labels. The '從 Cloud Storage 選取匯入檔案' section shows a file named 'leaves4-200-anno.csv' with a preview of its contents. A 'BROWSE' button is available to select a file from Cloud Storage. At the bottom, a note says '接下來呢?' (What's next?) and '圖片匯入完成，資料集也準備就緒後，您將會收到電子郵件' (After image import is complete, once the dataset is ready, you will receive an email).

AutoML

雲端建模雲端服務

a. 上傳資料

GCS to Vertex AI

The screenshot shows the Google Cloud Platform (GCP) interface for Vertex AI. The left sidebar menu is visible, with 'Vertex AI' selected. The main content area is titled 'leaves4-200' and shows the 'Import' tab selected. A sub-section titled 'Import to dataset' is displayed, with the sub-section 'Import from Cloud Storage' highlighted. The 'Import from Cloud Storage' section contains a form where 'leaves4-200-anno.csv' is selected, and a dropdown menu for 'Dataset split' is set to 'Default'. Below this, there's a 'Select Cloud Storage path' section with a path 'gs://enaiworld/leaves4-200/'. At the bottom, a note says 'Next? After import is complete, the dataset will be ready, and you will receive an email.' A large preview image on the right shows three types of clouds: CUMULUS, CIRRUS, and STRATUS.

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雲端建模雲端服務

a. 上傳資料

GCS to Vertex AI

約 15 分

Google Cloud Platform enai 搜尋產品和資源

Vertex AI leaves4-200 leaves4-200_icn

資訊主頁 資料集 功能 標籤工作 Workbench 管道 訓練 實驗 模型 端點 批次預測 中繼資料 Marketplace

匯入 **瀏覽** 分析

全部 500 已加標籤 500 未加標籤 0 訓練 400 驗證 0 測試 100

全選

Training jobs and models
Use this dataset and annotation set to train a new machine learning model with AutoML or custom code

訓練新模型

Labeling tasks
If your data still needs to be labeled, create a labeling task to have others label it for you

建立標籤工作

上傳和「enai」作業

上傳 500 個檔案
2019-11-09-12-48-10_200.jpg
2019-11-09-12-57-48_200.jpg
2019-11-09-13-08-09_200.jpg

每個頁面的項目數量: 10 1 - 10 (共有許多列)

AutoML

雲端建模雲端服務

b. 訓練模型

Google Cloud Platform enai

Vertex AI leaves4-200 leaves4-200_icn

搜尋產品和資源

資料集

功能

標籤工作

Workbench

管道

訓練

實驗

模型

端點

批次預測

中繼資料

Marketplace

匯入 **瀏覽** 分析

全部 500
已加標籤 500
未加標籤 0
訓練 400
驗證 0
測試 100

篩選 選項

全選

AE 125
FF 125
PF 125
PP 125

新增標籤

Training jobs and models

Use this dataset and annotation set to train a new machine learning model with AutoML or custom code.

訓練新模型

Labeling tasks

If your data still needs to be labeled, create a labeling task to have others label it for you.

建立標籤工作

上傳和「enai」作業

上傳 500 個檔案

2019-11-09-12-48-10_200.jpg
2019-11-09-12-57-48_200.jpg
2019-11-09-13-08-09_200.jpg

每個頁面的項目數量: 10 1 - 10 (共有許多列)

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b. 訓練模型



The screenshot shows the Google Cloud Platform Vertex AI Training interface. The top navigation bar includes the Google Cloud Platform logo, user account (enai), search bar ('搜尋產品和資源'), and various icons for notifications and account management.

The left sidebar menu for Vertex AI includes:

- 資訊主頁
- 資料集
- 功能
- 標籤工作
- Workbench
- 管道
- 訓練** (highlighted)
- 實驗
- 模型
- 端點
- 批次預測
- 中繼資料

The main content area is titled "訓練" (Training) and features a large "建立" (Create) button highlighted with a pink box. Below it are three tabs: TRAINING PIPELINES (selected), CUSTOM JOBS, and HYPERPARAMETER TUNING JOBS. A descriptive text explains that training pipelines are the primary workflow for training models in AutoML, mentioning self-defined training models and their automation. It also notes the use of external tools for managing training workloads and hyperparameter tuning.

A dropdown menu for "地區" (Region) is set to "us-central1 (愛荷華州)".

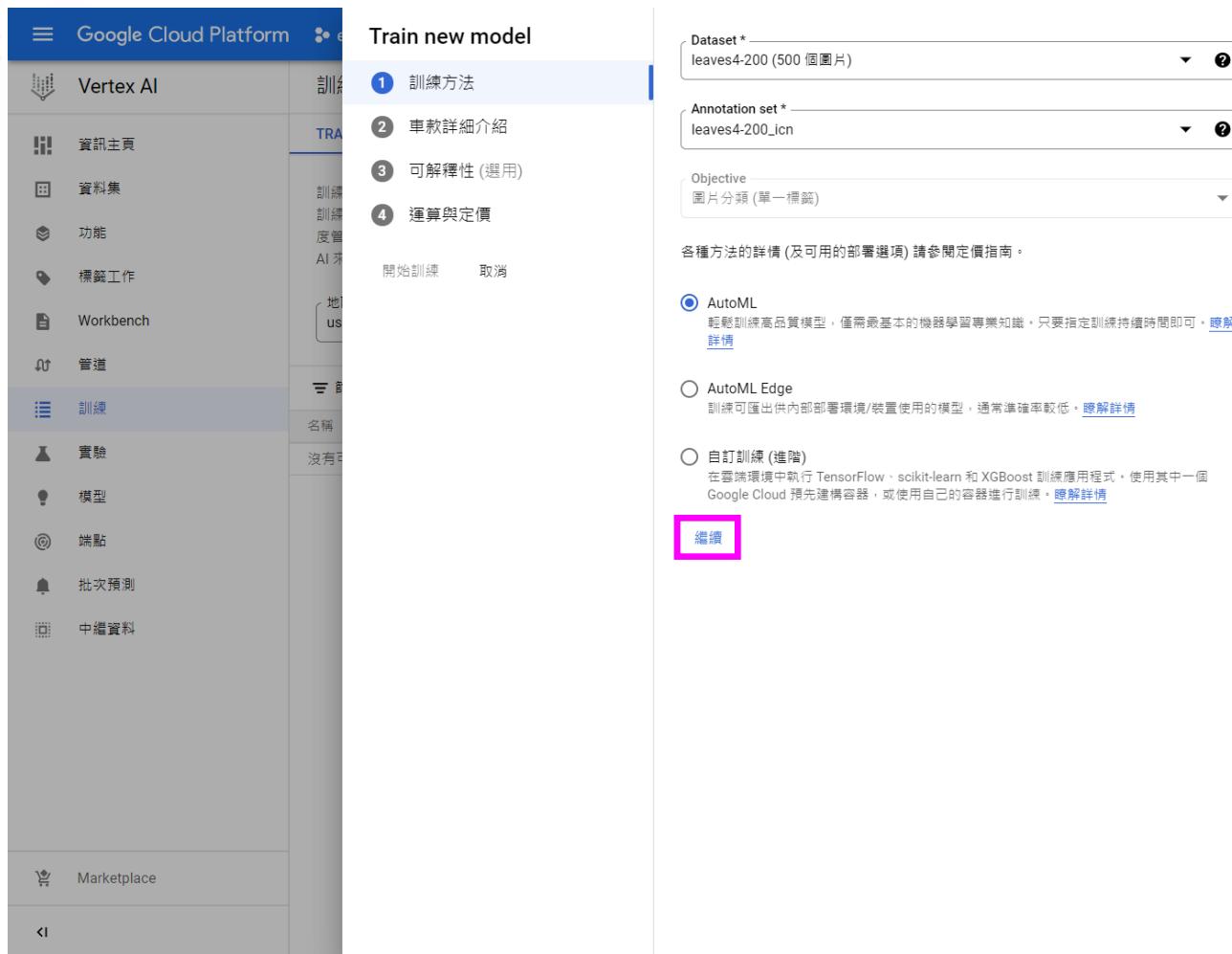
The "篩選" (Filter) section allows inputting a property name. The table below lists columns: 名稱 (Name), ID, 狀態 (Status), 工作類型 (Job Type), 模型類型 (Model Type), 建立時間 (Created Time), and 經過時間 (Last Run Time). A note states "沒有可顯示的列" (No rows to display).

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雲端建模雲端服務

b. 訓練模型

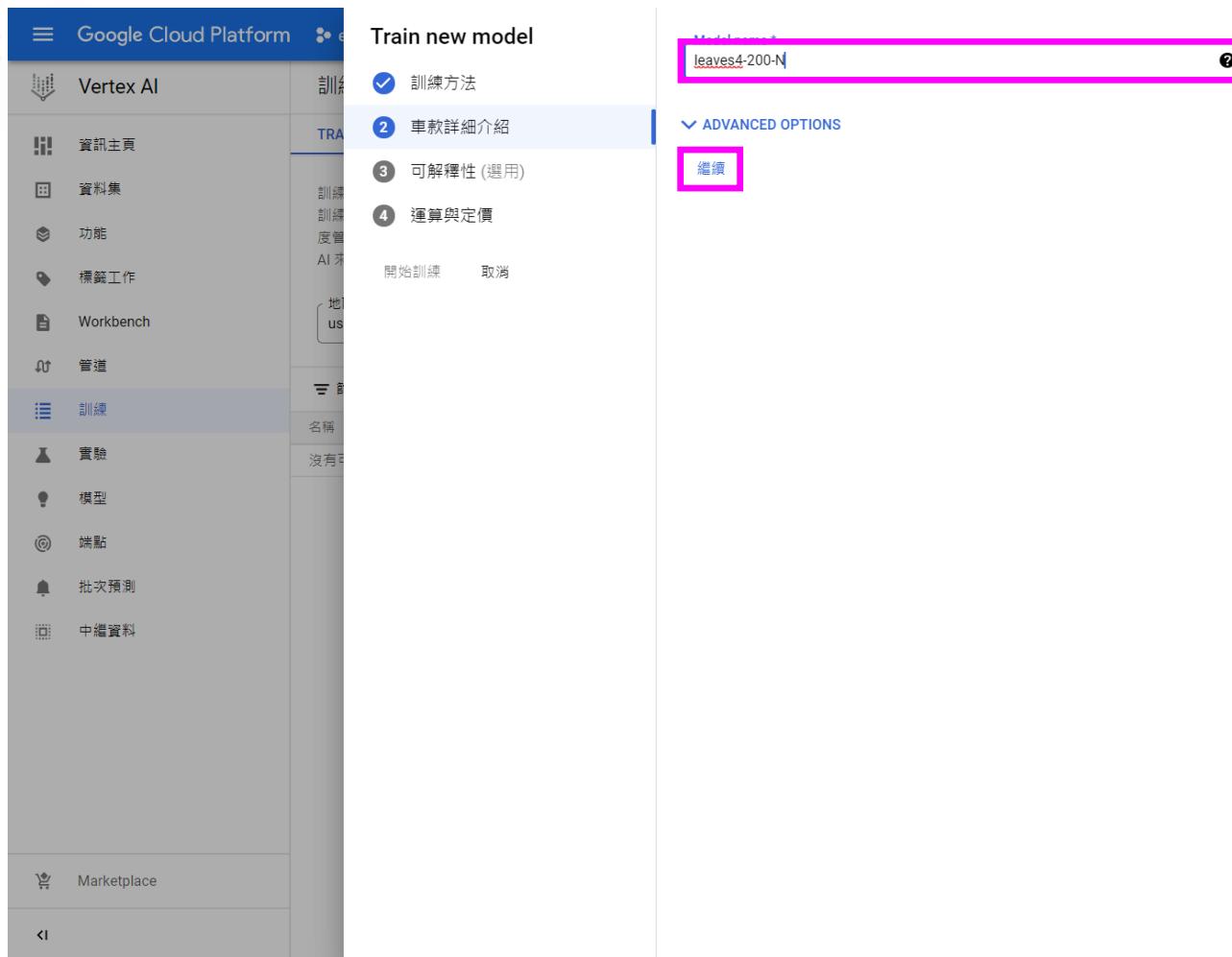
選擇訓練方法



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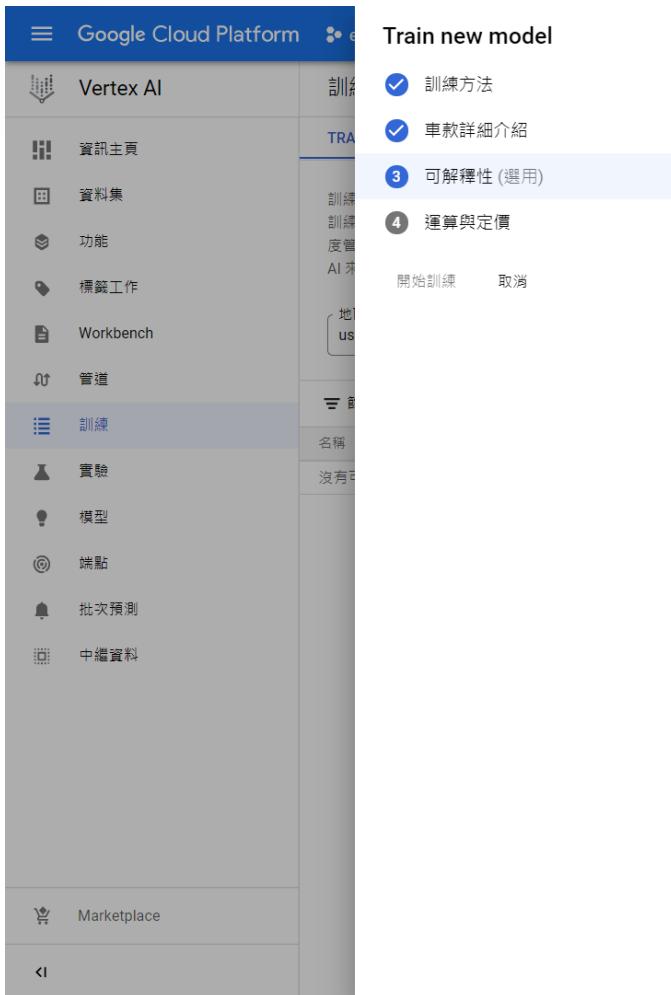
b. 訓練模型



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雲端建模雲端服務

b. 訓練模型

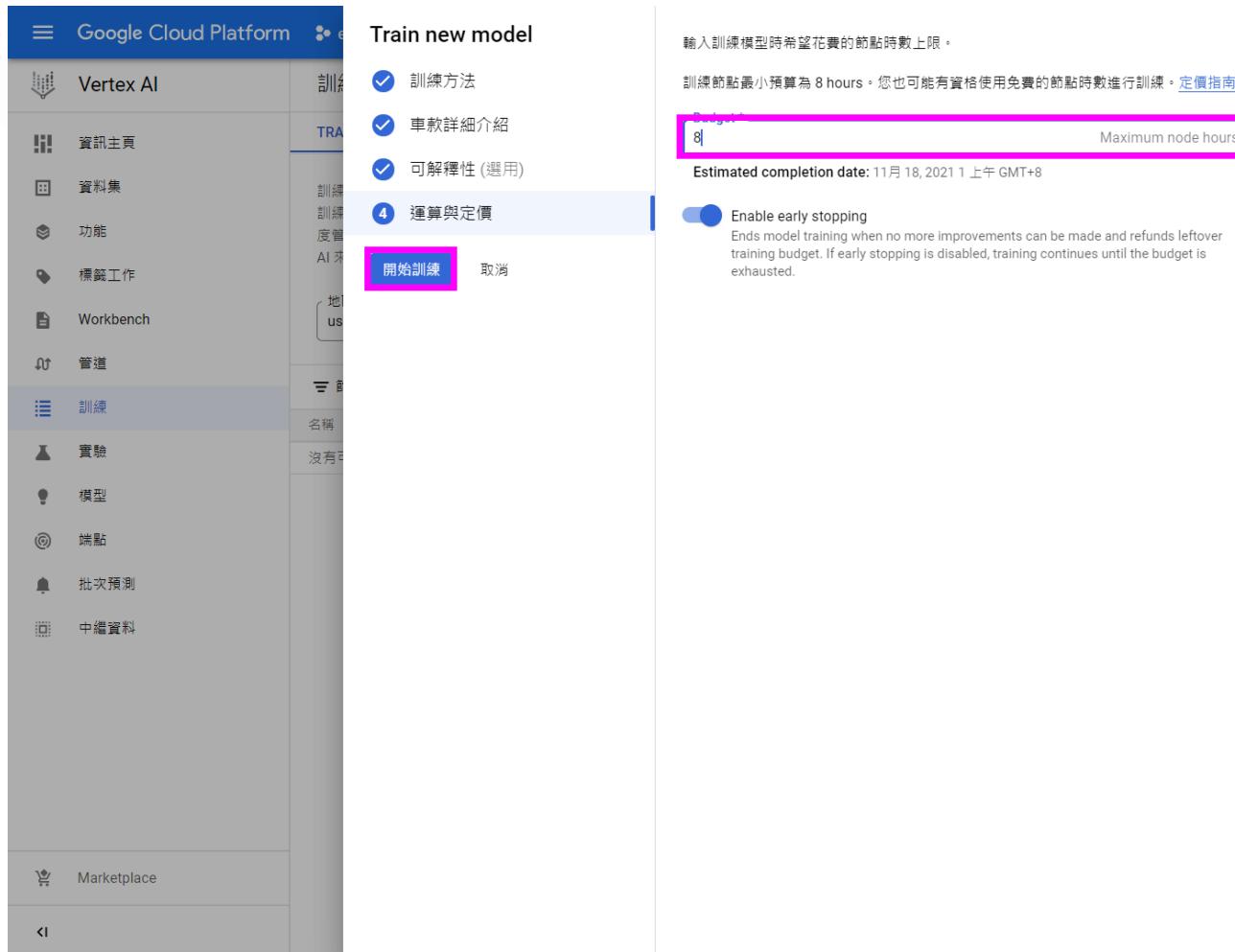


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b. 訓練模型

決定訓練預算



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雲端建模雲端服務

b. 訓練模型

開始訓練

約 29 分

The screenshot shows the Google Cloud Platform Vertex AI Training interface. On the left, there's a sidebar with options like 資訊主頁, 資料集, 功能, 標籤工作, Workbench, 管道, 訓練 (selected), 實驗, 模型 (highlighted with a red box), 端點, 批次預測, and 中繼資料. The main area has tabs for TRAINING PIPELINES, CUSTOM JOBS, and HYPERPARAMETER TUNING JOBS. Below the tabs is a description of what training pipelines are. A dropdown for 地區 is set to us-central1 (愛荷華州). A search bar says '輸入屬性名稱'. A table lists a single training job:

名稱	ID	狀態	工作類型	模型類型	建立時間	經過時間
leaves4-200-N	3274941562819182592	已完成	訓練管線	圖片分類 (單一標籤)	2021年11月17日 下午11:32:17	28分鐘 36秒

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雲端建模雲端服務

b. 訓練模型

評價模型

The screenshot shows the Google Cloud Platform Vertex AI interface. On the left, there is a sidebar with various options: 資訊主頁, 資料集, 功能, 標籤工作, Workbench, 管道, 訓練, 實驗, 模型 (which is highlighted), 端點, 批次預測, and 中繼資料. The main area displays information about models. At the top, it says "Vertex AI" and has buttons for "建立" (Create) and "匯入" (Import). A search bar says "搜尋產品和資源". Below that, there is a section for "地區" (Region) set to "us-central1 (愛荷華州)". A table lists two models:

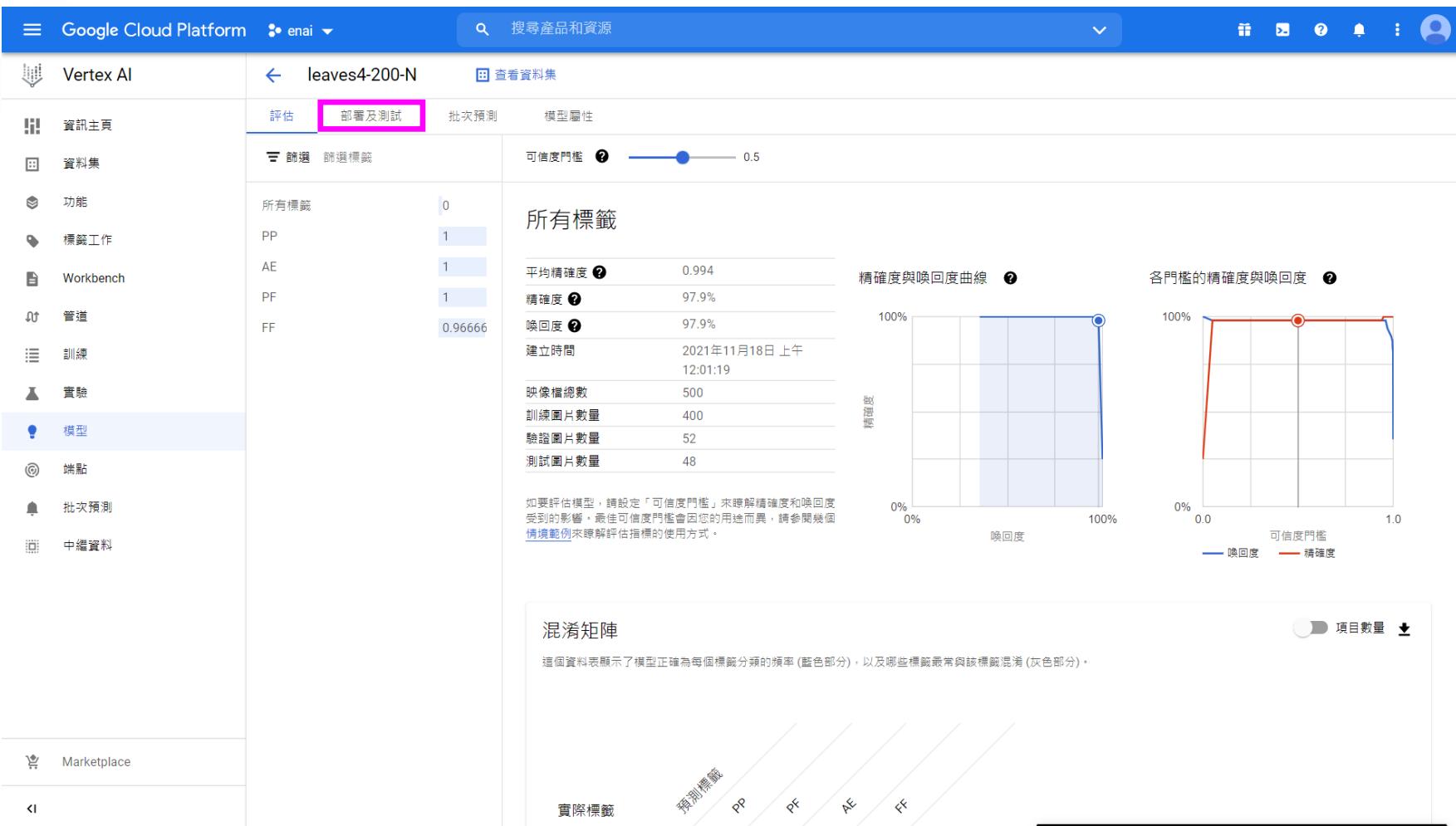
名稱	ID	狀態	資料	端點	區域	類型	建立時間	通知	標籤
leaves4-200-N	3435195382567534592	已就緒	leaves4-200.lcn	0	us-central1	圖片分類 AutoML	2021年11月17日下午11:32:17		
trees14-200	2403659961667158016	已就緒	-	1 SHOW ENDPOINTS	us-central1	匯入 自訂訓練	2021年11月16日上午11:53:13		

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b. 訓練模型

評價模型



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C. 部署模型

The screenshot shows the Google Cloud Platform Vertex AI interface. The left sidebar menu is visible, with 'Vertex AI' selected. Under 'Vertex AI', the '模型' (Model) option is highlighted. The main content area is titled 'leaves4-200-N' and shows the '部署及測試' (Deployment & Testing) tab selected. A prominent button labeled '部署至端點' (Deploy to Endpoint) is highlighted with a pink box. Below it, a table header for '測試模型' (Test Model) is shown, with columns: 名稱 (Name), ID, 狀態 (Status), 模型 (Model), 區域 (Region), 監控 (Monitoring), 最近期的監控工作 (Recent Monitoring Work), 最新快訊 (Latest News), 上次更新時間 (Last Updated), API, 通知 (Notifications), 標籤 (Tags), and 加密方式 (Encryption). A message at the bottom states: '您需要先部署模型，才能進行測試。' (You need to deploy the model before testing.) with a link to '定價指南' (Pricing Guide).

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c. 部署模型

The screenshot shows the Google Cloud Platform Vertex AI interface. On the left, the sidebar menu includes: 資訊主頁, 資料集, 功能, 標籤工作, Workbench, 管道, 訓練, 實驗, 模型 (selected), 端點, 批次預測, and 中繼資料. The main content area is titled 'leaves4-200-N' and shows tabs for 評估, 部署及測試 (selected), 批次預測, and 模型屬性. A prominent button '部署至端點' is visible. To the right, a detailed deployment wizard is open:

- 部署至端點**:
 - 1 定義端點**: Shows the '建立新端點' radio button selected, with the input field 'leaves4-200-N-end' highlighted with a pink box.
 - 2 模型設定**: Includes a '部署' button and a 'CANCEL' button.
- 位置**: Set to 'us-central1 (愛荷華州)'.
- 存取權限**:
 - 標準**: Selected, with a note about REST API access.
 - 私人**: Unselected, with a note about private endpoints.
- 進階選項**: Contains a '繼續' button, also highlighted with a pink box.

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c. 部署模型

The screenshot shows the Google Cloud Platform Vertex AI interface. On the left, the sidebar menu includes: 資訊主頁, 資料集, 功能, 標籤工作, Workbench, 管道, 訓練, 實驗, 模型 (highlighted), 端點, 批次預測, 中繼資料, Marketplace, and Help. The main content area displays the 'leaves4-200-N' endpoint details. The '部署及測試' tab is selected. A prominent 'Deploy your model' section contains a '部署至端點' button. To the right, a detailed configuration dialog is open:

- 部署至端點**: Step 1: 定義端點 (checkbox checked). Step 2: 模型設定 (selected).
- 部署** (highlighted with a pink box) and CANCEL buttons.
- 模型設定** (highlighted with a pink box):
 - leaves4-200-N**: 流量拆分 * 100%.
 - 說明: 如果是 AutoML 圖片分類和物件偵測模型，必須為每個模型配置固定數量的運算節點。日後如要變更這個模型的運算資源，您必須建立新端點。[定價指南](#).
 - 部署節點數量**: 1 (highlighted with a pink box). 說明: 為這個端點配置的節點數量。
 - 記錄功能**: 啟用這個端點的存取記錄功能 (checkbox checked). 說明: 這個端點的記錄設定一經確認即無法變更，並會產生 Cloud Logging 費用。日後如要變更記錄功能的偏好設定，請建立新的端點。[瞭解詳情](#).
- 取消** and **完成** buttons at the bottom.

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c. 部署模型

開始部署

約 9 分

The screenshot shows the Google Cloud Platform Vertex AI interface. The left sidebar navigation bar includes options like 資訊主頁, 資料集, 功能, 標籤工作, Workbench, 管道, 訓練, 實驗, 模型 (highlighted), 端點, 批次預測, and 中繼資料. The main content area is titled 'leaves4-200-N' and shows tabs for 評估, 部署及測試 (selected), 批次預測, and 模型屬性. A sub-section titled 'Deploy your model' explains what endpoints are and how they work. Below this is a table listing the deployed endpoint details:

名稱	ID	狀態	模型	區域	監控	最近期的監控工作	最新快訊	上次更新時間	API	通知	標籤	加密方式
leaves4-200-N-end	3376160404248985600	可用	1	us-central1	已停用	-	-	2021年11月18日 下午9:30:01	要求範例	Google 代管的金鑰		

Below the table are sections for '測試模型' (Test Model) with a '預覽' (Preview) button and a '上傳圖片' (Upload Image) button.

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C. 部署模型

驗證
從頭

The screenshot shows the Google Cloud Platform Vertex AI interface. The left sidebar lists various options: 資訊主頁, 資料集, 功能, 標籤工作, Workbench, 管道, 訓練, 實驗, 模型 (highlighted), 端點, 批次預測, and 中繼資料. The main content area is titled 'leaves4-200-N' and shows tabs for 評估, 部署及測試 (selected), 批次預測, and 模型屬性. Below this is a section titled 'Deploy your model' with a sub-section 'Endpoints'. It explains that Endpoints are machine learning models made available for online prediction requests. A large blue button labeled '部署至端點' is visible. To its right is a table listing a single endpoint:

名稱	ID	狀態	模型	區域	監控	最近期的監控工作	最新快訊	上次更新時間	API	通知	標籤	加密方式
leaves4-200-N-end	3376160404248985600	可用	1	us-central1	已停用	-	-	2021年11月18日 下午9:30:01	要求範例	Google 代管的金鑰		

Below the table are sections for '測試模型' (with a '預覽' button) and '上傳圖片'.

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C. 部署模型

驗證

青楓

Google Cloud Platform enai 搜尋產品和資源

Vertex AI leaves4-200-N 查看資料集

評估 部署及測試 批次預測 模型屬性

PP 0.000
PF 0.000
AE 1.000
FF 0.000

上傳圖片

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雲端建模雲端服務

C. 部署模型

驗證

盾柱木

Google Cloud Platform enai 搜尋產品和資源

Vertex AI leaves4-200-N 查看資料集

評估 部署及測試 批次預測 模型屬性

PP 1.000
PF 0.000
AE 0.000
FF 0.000

上傳圖片

Marketplace

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d. 叫用模型

下載官方叫用函式

<https://github.com/googleapis/> > Find a repository: python-aiplatform > python-aiplatform > samples > snippets > prediction_service > predict_image_classification_sample.py

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d. 叫用模型

```
import os  
import predict_image_classification_sample as p  
  
YOUT_PROJECT = 'YOUR_PROJECT'  
YOUR_ENDPOINT = 'YOUR_ENDPOINT'  
YOUR_PIC = 'pp.jpg'  
YOUR_SERVICE = 'YOUR_SERVICE'  
  
os.environ['GOOGLE_APPLICATION_CREDENTIALS'] = YOUR_SERVICE  
p.predict_image_classification_sample(YOUT_PROJECT, YOUR_ENDPOINT, YOUR_PIC)
```

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雲端建模地端應用

- a. 上傳資料
- b. 訓練模型
- c. 部署模型

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雲端建模地端應用

a. 上傳資料

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雲端建模地端應用

b. 訓練模型

The screenshot shows the Google Cloud Platform Vertex AI interface. On the left, a sidebar menu for 'Vertex AI' lists various options: 資訊主頁, 資料集, 功能, 標籤工作, Workbench, 管道, 訓練 (highlighted with a pink box), 實驗, 模型, 端點, 批次預測, and 中繼資料. At the top, there are tabs for TRAINING PIPELINES, CUSTOM JOBS, and HYPERPARAMETER TUNING JOBS. A prominent '建立' (Create) button is located at the top right of the main content area. Below it, a section titled '訓練管線' provides an overview of what training pipelines are used for. A dropdown menu for '地區' (Region) is set to 'us-central1 (愛荷華州)'. The main table displays a single completed training job:

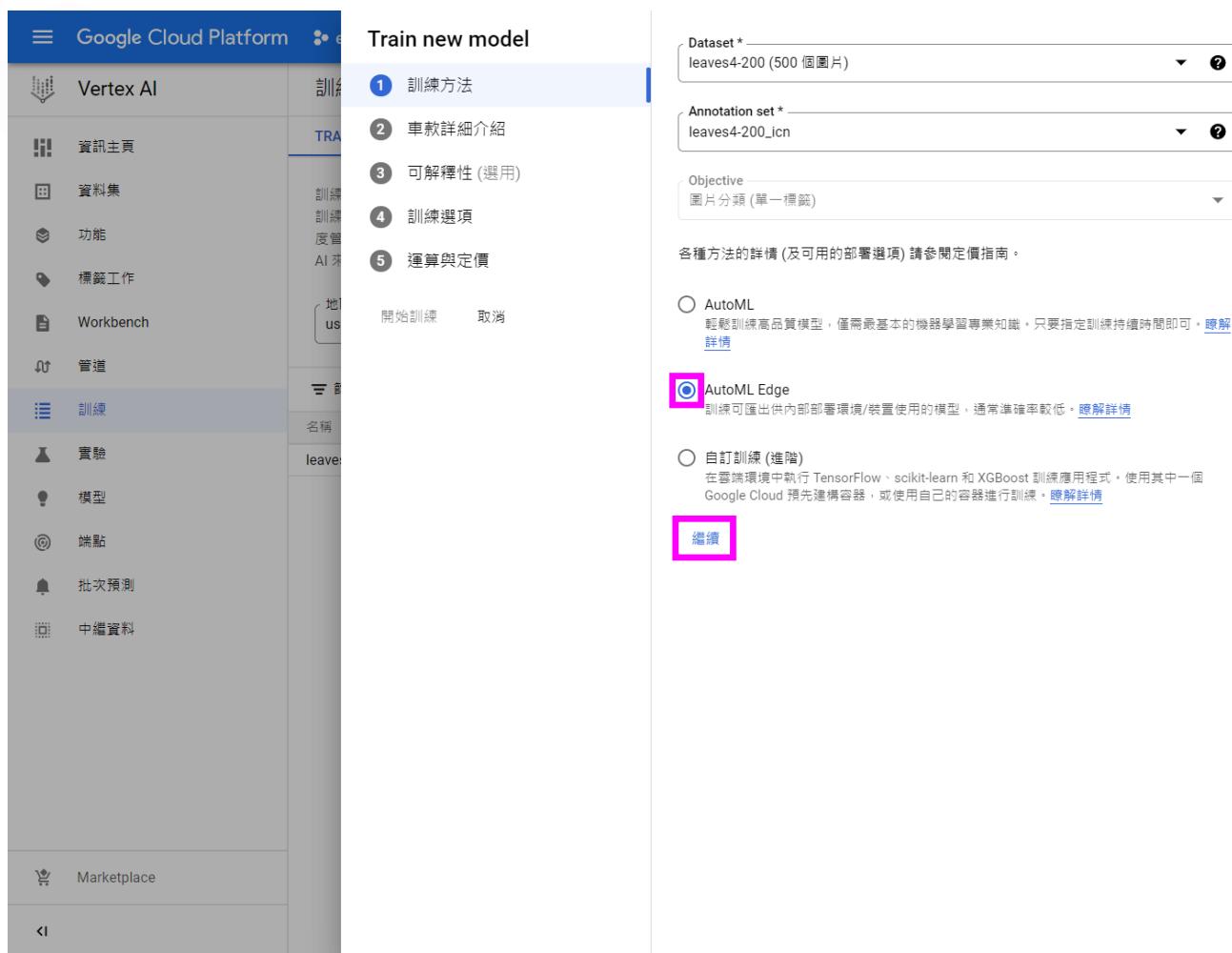
名稱	ID	狀態	工作類型	模型類型	建立時間	經過時間
leaves4-200-N	3274941562819182592	已完成	訓練管線	圖片分類 (單一標籤)	2021年11月17日 下午11:32:17	28分鐘 36秒

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雲端建模地端應用

b. 訓練模型

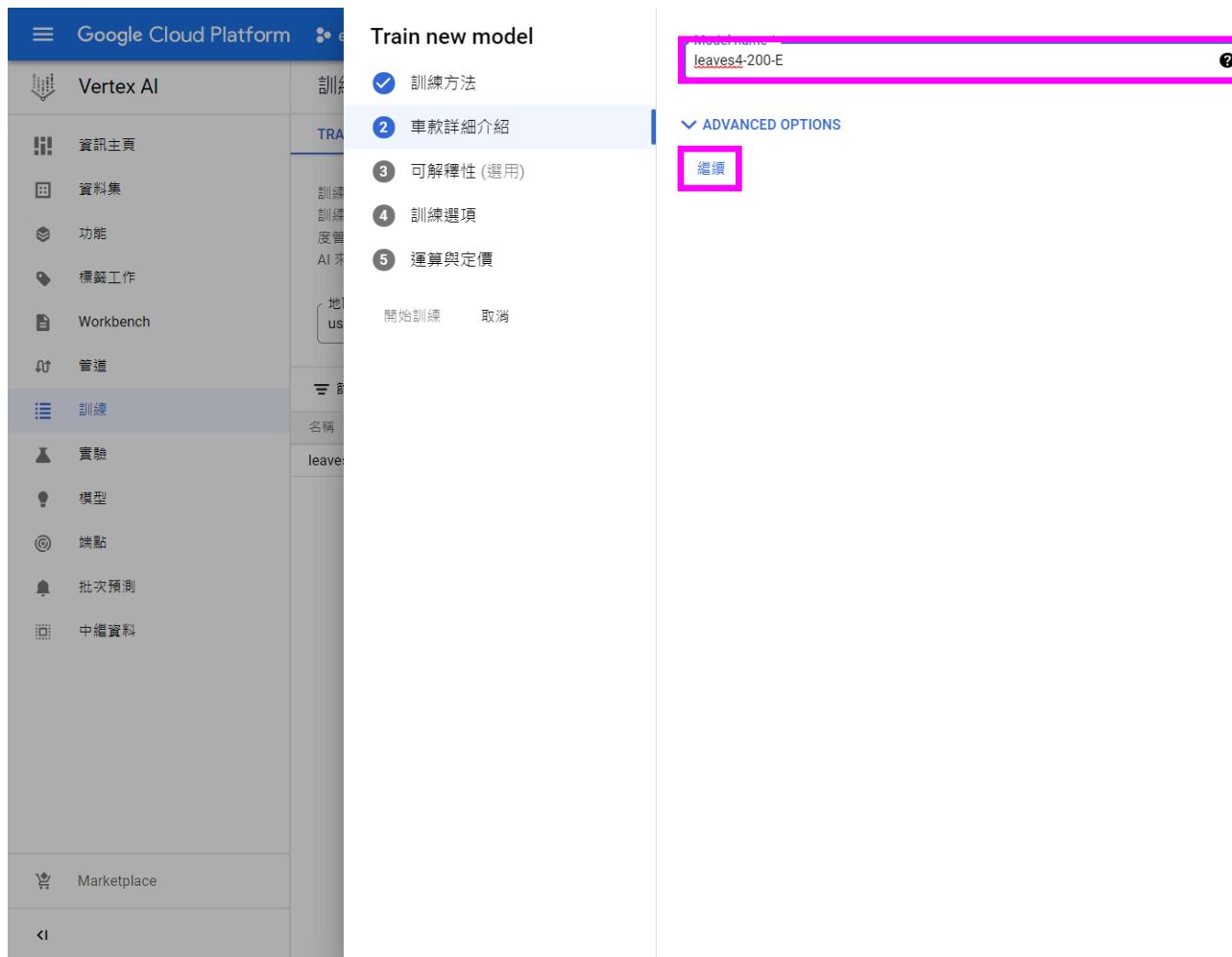
選擇訓練方法



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雲端建模地端應用

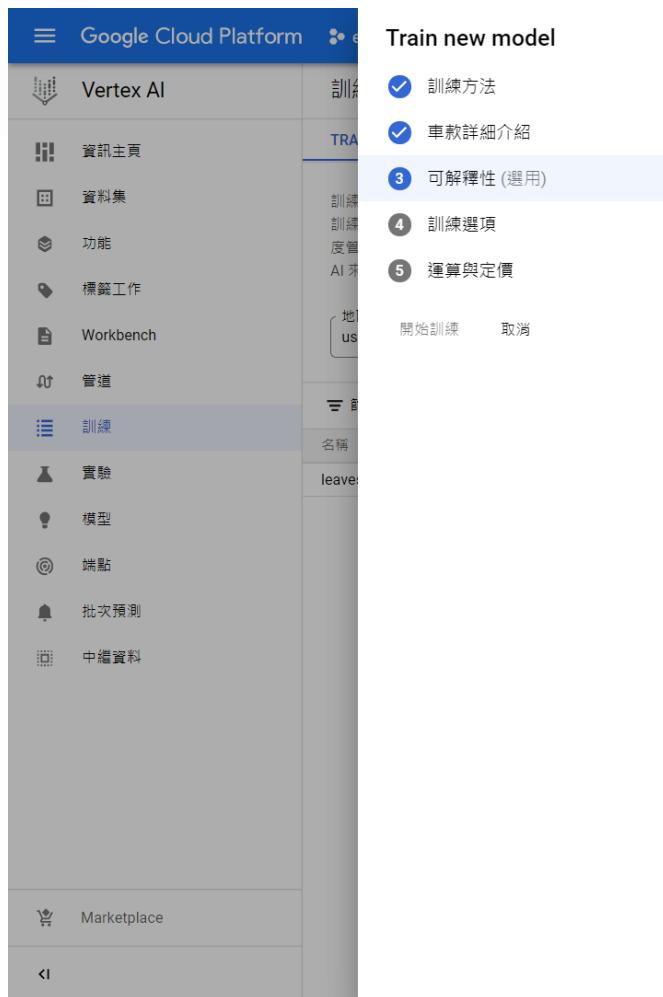
b. 訓練模型



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雲端建模地端應用

b. 訓練模型



Vertex AI 中的模型可以透過特徵歸因來解釋，讓您瞭解各項特徵對預測結果的影響程度。
您可以依據這項資訊確認模型的行為是否符合預期、找出模型偏誤，以及探索改善模型和
訓練資料的方式。解釋功能會產生少許額外費用。[瞭解詳情](#)

針對測試集內的每張圖片產生可解釋的點陣圖

繼續

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雲端建模地端應用

b. 訓練模型

選擇模型精度

The screenshot shows the Google Cloud Platform Vertex AI interface for training a new model. On the left, the sidebar lists various AI services: Vertex AI, Workbench, Pipelines, Training, Experiments, Models, Endpoints, and Batch Predictions. The 'Training' option is selected.

The main panel displays the 'Train new model' configuration screen. It includes a sidebar with five steps: 1. Training method, 2. Model details, 3. Explainability (optional), 4. Training options, and 5. Performance trade-off. Step 4 is currently active.

Under step 4, there is a table comparing three training objectives:

目標	套件大小	準確率	Latency on iPhone X
Higher accuracy	5.6 MB	Higher	34ms
Best trade-off	3.1 MB	Medium	23ms
Faster predictions	557 KB	Lower	8ms

A note below the table states: "請注意，預測延遲估計值僅供參考。實際延遲時間須視網路連線狀況而定。Edge TPU 預測資料的延遲時間通常較短。"

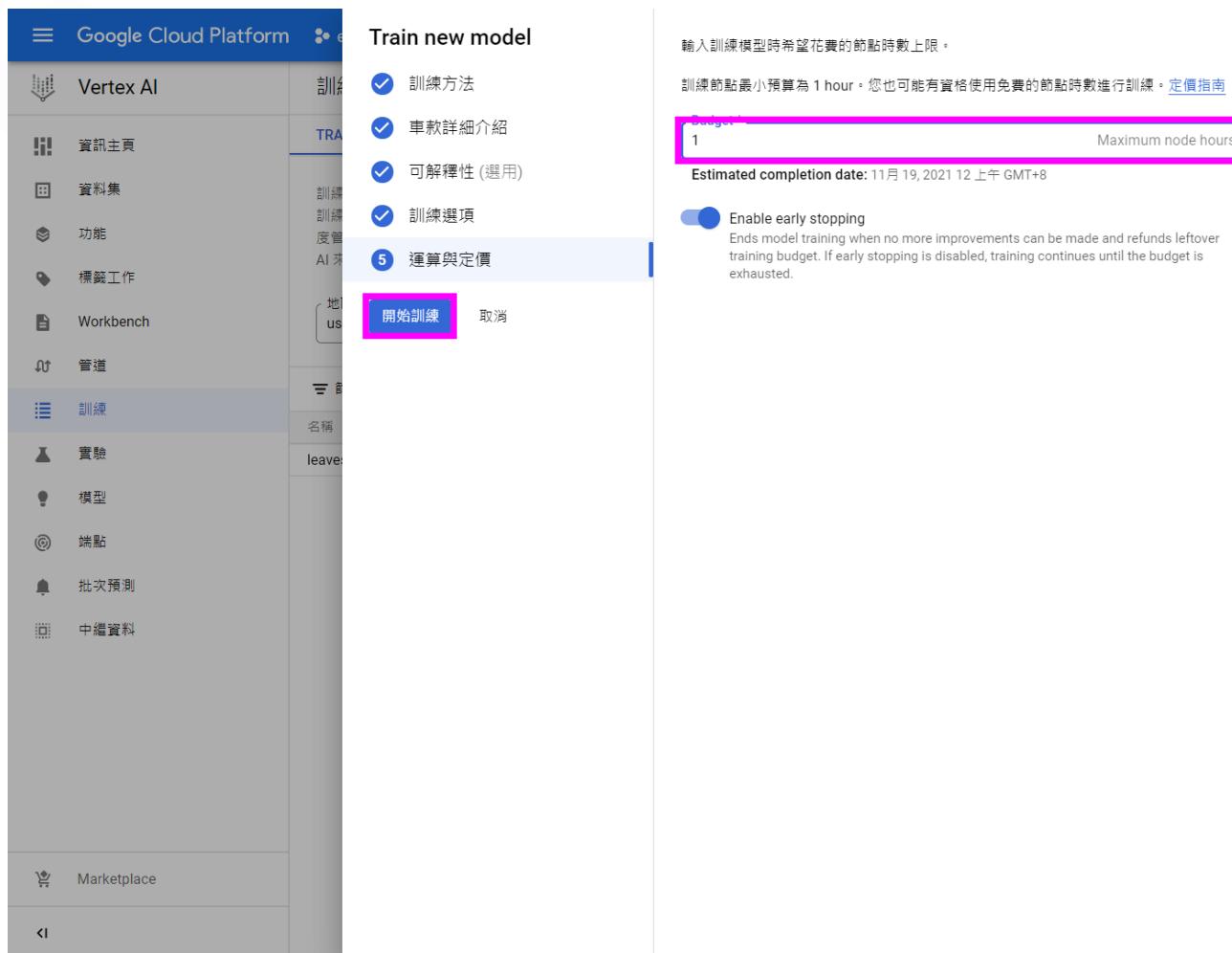
At the bottom right of the panel, a button labeled "繼續" (Continue) is highlighted with a pink rectangle.

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雲端建模地端應用

b. 訓練模型

決定訓練預算



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雲端建模地端應用

b. 訓練模型

開始訓練

約 68 分

The screenshot shows the Google Cloud Platform Vertex AI Training interface. The left sidebar is titled 'Vertex AI' and includes options like '資訊主頁', '資料集', '功能', '標籤工作', 'Workbench', '管道', '訓練' (selected), '實驗', '模型', '端點', '批次預測', and '中繼資料'. The main content area has tabs for 'TRAINING PIPELINES' (selected), 'CUSTOM JOBS', and 'HYPERPARAMETER TUNING JOBS'. A descriptive text explains that training pipelines are the main workflow for building models using AutoML. It mentions self-defined training models and how pipelines handle steps like data management, job scheduling, and parameter tuning. A dropdown menu shows the region 'us-central1 (愛荷華州)'. Below is a table of completed training jobs:

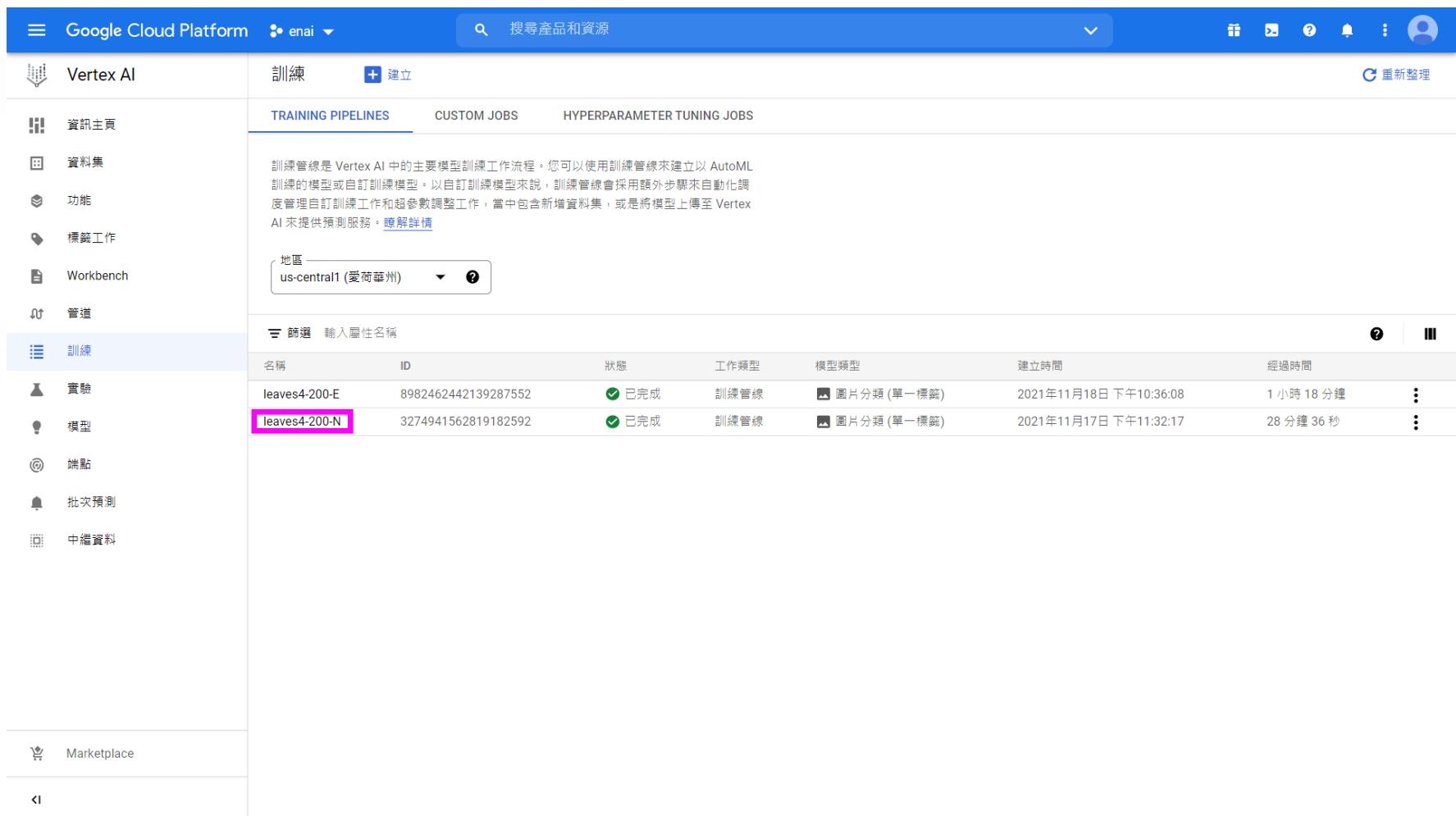
名稱	ID	狀態	工作類型	模型類型	建立時間	經過時間
leaves4-200-E	8982462442139287552	已完成	訓練管線	圖片分類 (單一標籤)	2021年11月18日下午10:36:08	1小時 18 分鐘
leaves4-200-N	3274941562819182592	已完成	訓練管線	圖片分類 (單一標籤)	2021年11月17日下午11:32:17	28分鐘 36秒

AutoML Edge

雲端建模地端應用

b. 訓練模型

評價模型



The screenshot shows the Google Cloud Platform Vertex AI Training interface. The left sidebar menu is collapsed, and the main navigation bar includes 'Google Cloud Platform', a user dropdown, a search bar ('搜尋產品和資源'), and various icons for account and settings.

The 'Vertex AI' section is selected, and the '訓練' (Training) tab is active. Below it, other tabs include 'TRAINING PIPELINES', 'CUSTOM JOBS', and 'HYPERPARAMETER TUNING JOBS'. A descriptive text about training pipelines is present.

A dropdown menu for '地區' (Region) is set to 'us-central1 (愛荷華州)'. A filter bar labeled '輸入屬性名稱' (Input Feature Name) is shown.

The main table lists two completed training jobs:

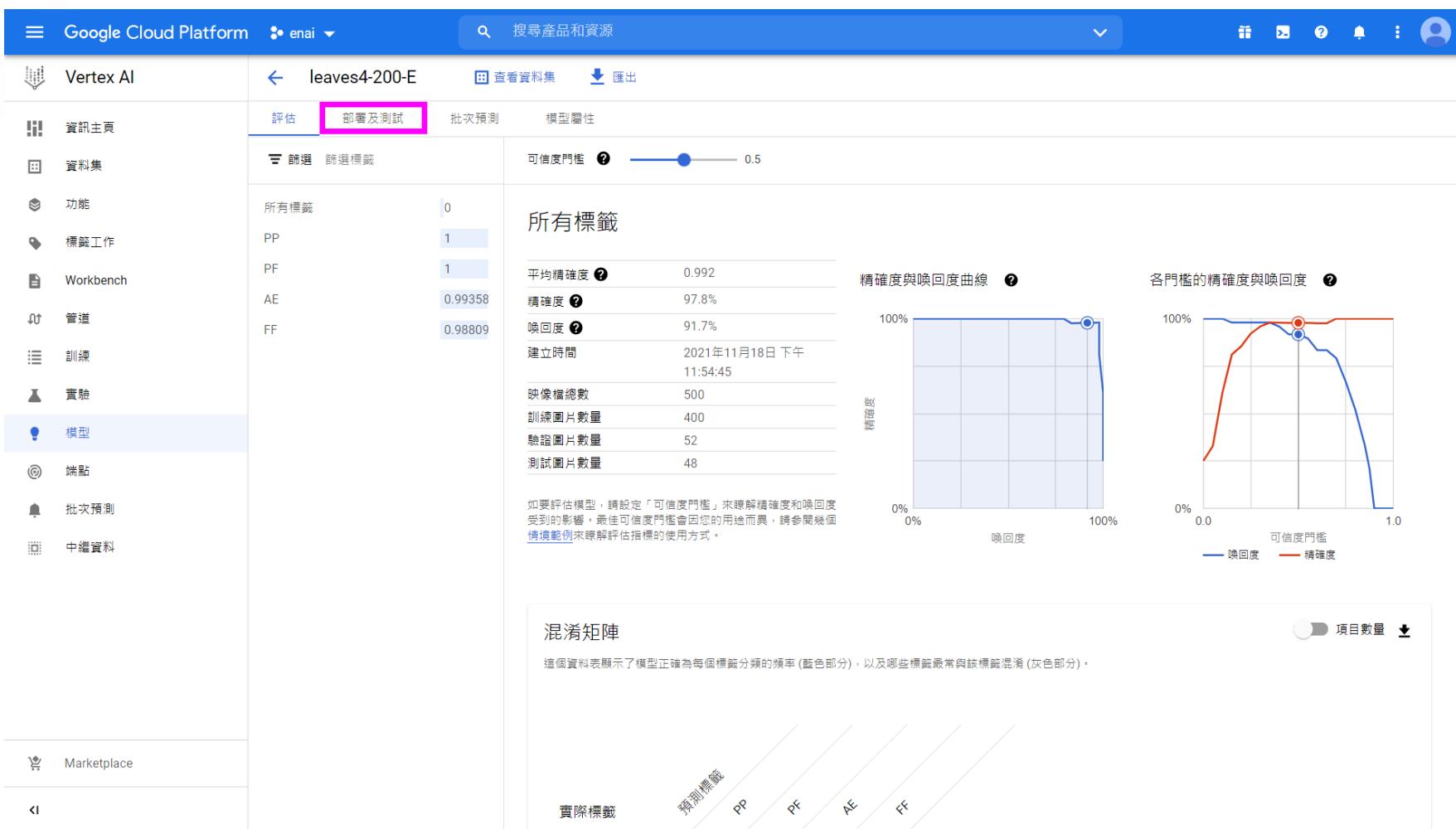
名稱	ID	狀態	工作類型	模型類型	建立時間	經過時間
leaves4-200-E	8982462442139287552	已完成	訓練管線	圖片分類 (單一標籤)	2021年11月18日下午10:36:08	1小時 18 分鐘
leaves4-200-N	3274941562819182592	已完成	訓練管線	圖片分類 (單一標籤)	2021年11月17日下午11:32:17	28分鐘 36秒

AutoML Edge

雲端建模地端應用

b. 訓練模型

評價模型



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雲端建模地端應用

C. 部署模型

匯出模型

The screenshot shows the Google Cloud Platform Vertex AI interface for a project named "leaves4-200-E". The left sidebar navigation bar includes links for Vertex AI, 資訊主頁, 資料集, 功能, 標籤工作, Workbench, 管道, 訓練, 實驗, 模型 (highlighted in blue), 端點, 批次預測, and 中繼資料.

The main content area has tabs: 評估, 部署及測試 (selected), 批次預測, and 模型屬性. Below these tabs, the heading "Use your edge-optimized model" is displayed, followed by five deployment options:

- TF Lite**: 將模型匯出為 TF Lite 套件，以在邊緣或行動裝置上執行模型。
- Edge TPU TF Lite**: 將模型匯出為 TF Lite 套件，以在 Edge TPU 裝置上執行模型。
- Container**: 將模型匯出為 TF Saved Model 以便在 Docker 容器上執行。
- Core ML**: 匯出 .mlmodel 檔案，以便在 iOS 和 macOS 裝置上執行模型。
- TensorFlow.js**: (highlighted with a pink border) 將模型匯出為 TensorFlow.js 檔案，以便在瀏覽器或 Node.js 環境中執行模型。

Below the deployment options, the heading "Deploy your model" is shown, followed by a description of Endpoints and a "部署至端點" button. A table header with columns: 名稱, ID, 狀態, 模型, 區域, 監控, 最近期的監控工作, 最新快訊, 上次更新時間, API, 通知, 標籤, 加密方式.

The "測試模型" section contains a note: "您需要先部署模型，才能進行測試。" with a link to "定價指南".

AutoML Edge

雲端建模地端應用

c. 部署模型

匯出模型

The screenshot shows the Google Cloud Platform Vertex AI interface. On the left, there's a sidebar with various options like 資訊主頁, 資料集, 功能, 標籤工作, Workbench, 管道, 訓練, 實驗, 模型 (selected), 端點, 批次預測, and 中繼資料. The main area has tabs for 評估, 部署及測試 (selected), 批次預測, and 模型屬性. Below these tabs, there's a section titled "Use your edge-optimized model" with two options: TF Lite and Edge TPU TF Lite. Underneath is a "Deploy your model" section with a note about endpoints and a "部署至端點" button. To the right, there's a "匯出模型" section with instructions for exporting to TensorFlow.js, a Cloud Storage dropdown set to gs://enaiworld/leaves4-200-E-js/, and a "BROWSE" button. A large blue "匯出" button is highlighted with a pink box. Below it, step 2 of the export process is described: "模型匯出作業需要幾分鐘才能完成。匯出作業完成之後，請使用下列指令將套件複製到電腦：" followed by a command line example: \$ gsutil cp -r gs://enaiworld/leaves4-200-E-js/ ./downl. There's also a "關閉" button.

AutoML Edge

雲端建模地端應用

c. 部署模型

匯出模型

The screenshot shows the Google Cloud Platform Vertex AI interface for a model named "leaves4-200-E". The left sidebar is collapsed, and the main area has tabs for "Assess", "Deploy & Test" (which is selected), "Batch Predict", and "Model Properties".

Use your edge-optimized model:

- TF Lite:** 將模型匯出為 TF Lite 套件，以在邊緣或行動裝置上執行模型。
- Edge TPU TF Lite:** 將模型匯出為 TF Lite 套件，以在 Edge TPU 裝置上執行模型。

Deploy your model:

Endpoints are machine learning models made available for online prediction requests. Endpoints are useful for timely predictions from many users (for example, in response to an application request). You can also request batch predictions if you don't need immediate results.

Test Model (Previews): 您需要先部署模型，才能進行測試。 [定價指南](#)

匯出模型

您可以利用 TensorFlow.js JavaScript 程式庫，在網路瀏覽器或 Node.js 中使用模型。

- 將模型匯出為 TensorFlow.js 套件。
Cloud Storage 中的目的地資料夾 * [BROWSE](#)
- 模型匯出作業需要幾分鐘才能完成。匯出作業完成之後，請使用下列指令將套件複製到電腦：
`$ gsutil cp -r gs://enaiworld/leaves4-200-E-js/ ./download`

[匯出](#) [檢視資料夾](#)

[關閉](#)

AutoML Edge

雲端建模地端應用

c. 部署模型

匯出模型

The screenshot shows the Google Cloud Platform Cloud Storage interface. The left sidebar has 'Cloud Storage' selected. The main area shows a bucket named 'enaiworld'. The 'Objects' tab is selected, displaying a single folder named 'model-563587670165422080/'. The folder details show it was created in 'us-central1 (愛荷華州)' with 'Standard' storage class. A warning icon indicates it is '受到物件 ACL 的限制' (restricted by object ACL). Below the table are various management actions like 'Upload file', 'Upload folder', 'Create folder', 'Manage retention', 'Download', and 'Delete'.

名稱	大小	類型	建立時間	儲存空間級別	上次修改日期	公開存取權	版本記錄	加密	保留到期日	訴訟保留
model-563587670165422080/	-	資料夾	-	-	-	-	-	-	-	-

- 補充如何用 gcloud 自 GCS 下載資料

Your Turn - Infer Your Edge

將前述 AutoML Edge 所取得模型進行 inference 叫用，不限於 TensorFlow Lite、Container、Core ML、TensorFlow.js (60 mins)

以 TensorFlow.js 為範例叫用模型



The End