

從零到一：親手打造 毫秒級啟動的 Spring Native 應用



ANDERSEN
思想科技

Agenda

 Native Image

 Lab Intro

 Q&A + Get Started!



思想科技

One Google 解決方案



Google Workspace

Google 辦公協作系統



Google Cloud

Google 雲端運算平台



Google Maps Platform

Google 地圖平台

Since 2010

跨區域技術支援

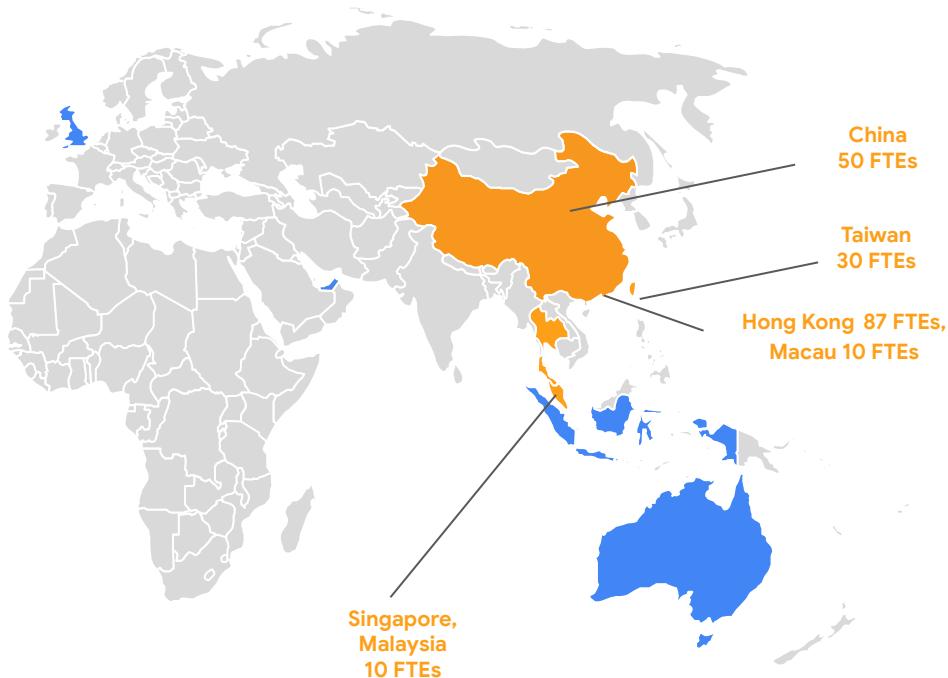
多產業客戶合作

One Google



營業據點分佈

Master Concept 的銷售和服務團隊遍佈亞洲 8 個國家和地區，為本地和國際客 戶提供服務，並準備擴大在英國和澳洲的業務



200+ staffs across
12 locations

1. Hong Kong*
2. Taiwan
3. Macau
4. Singapore*
5. Malaysia
6. Beijing
7. Shenzhen
8. Hangzhou
9. Nanjing
10. Xian

New and Upcoming
offices

1. Ireland
2. Sydney
3. London (soon)
4. Dubai (soon)
5. Delaware (U.S.)
6. India

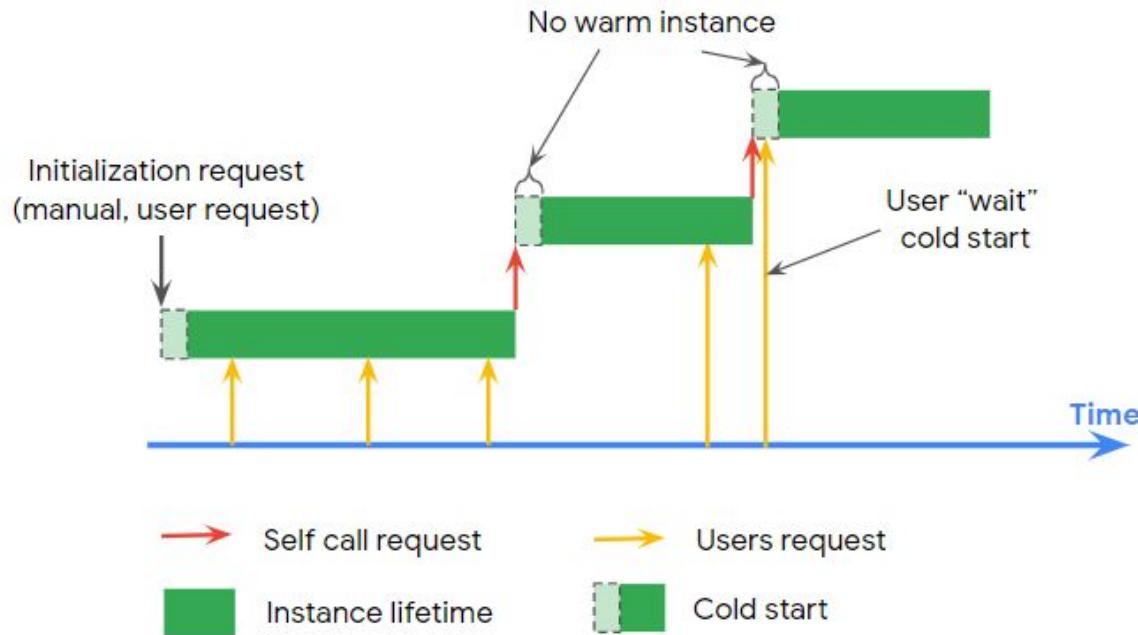
*Dual-HQ



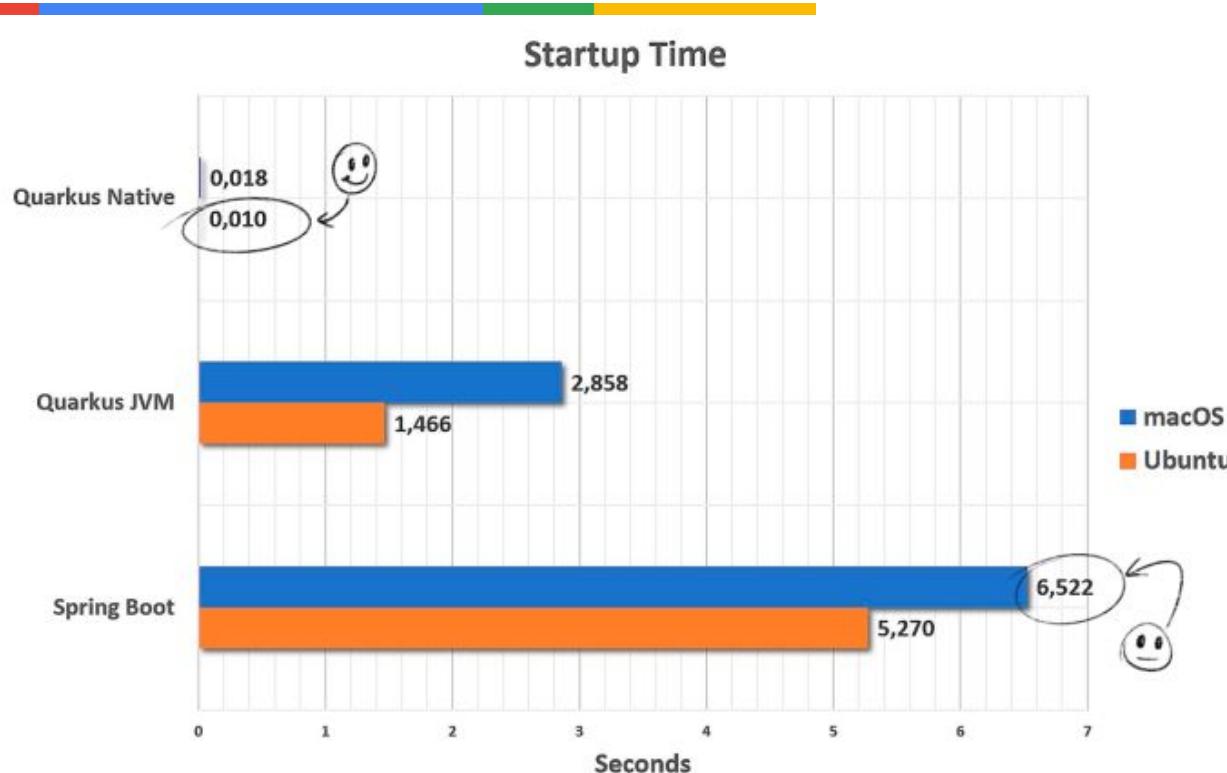
01

Native Image

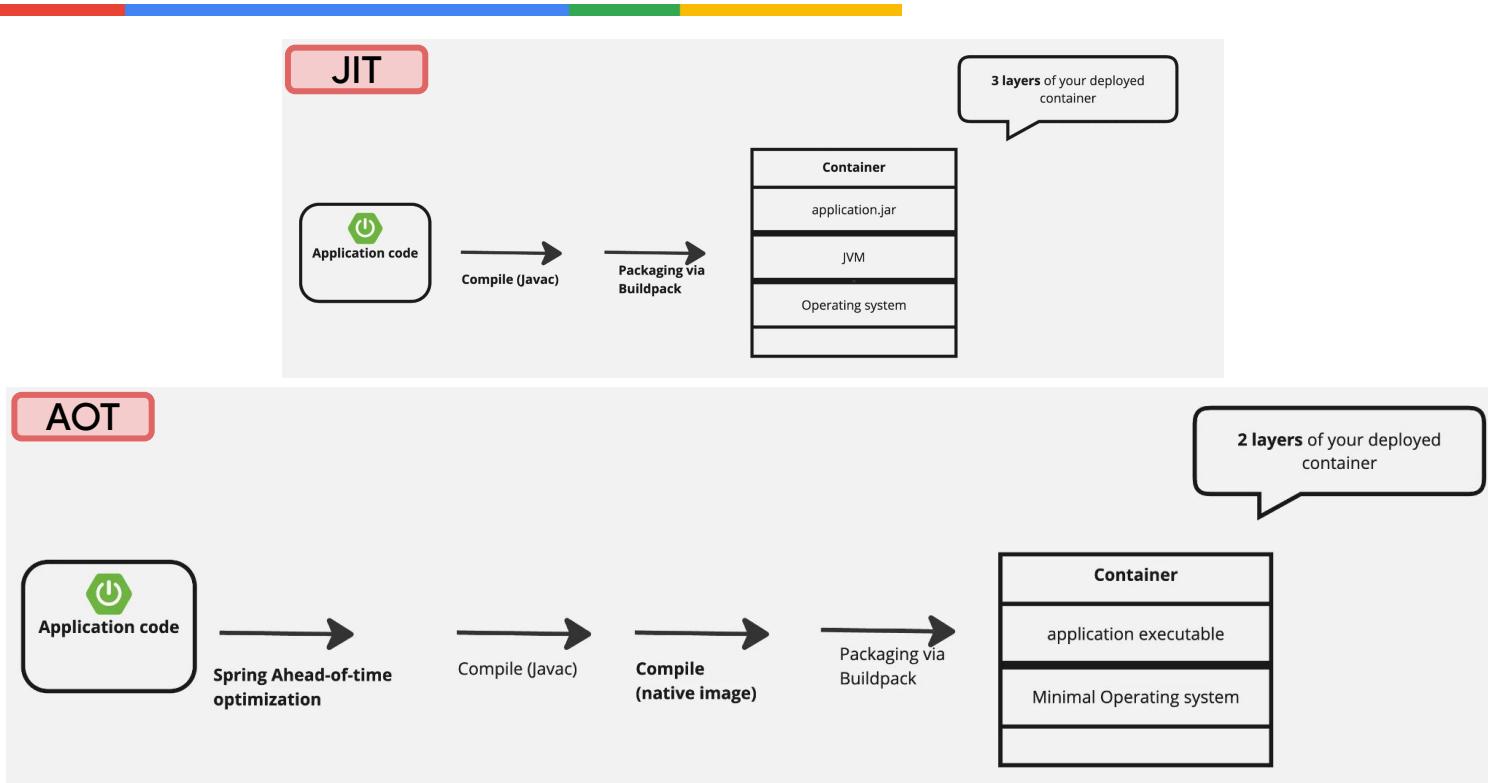
Serverless with Cloud Native App



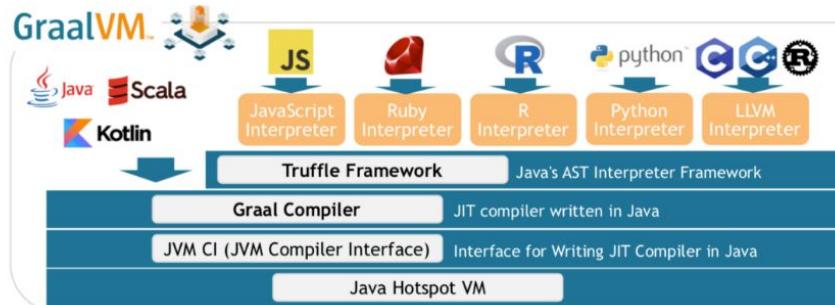
傳統 Java 應用的挑戰



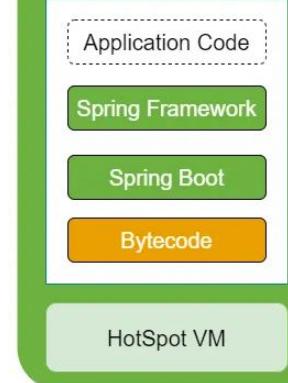
JIT x AOT



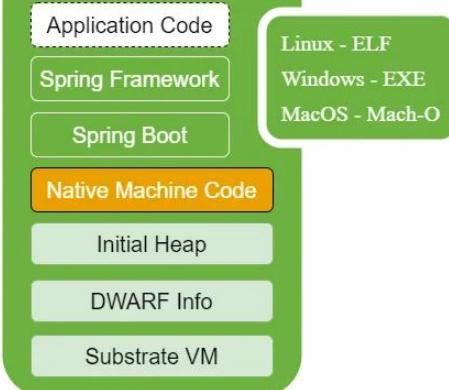
GraalVM Project



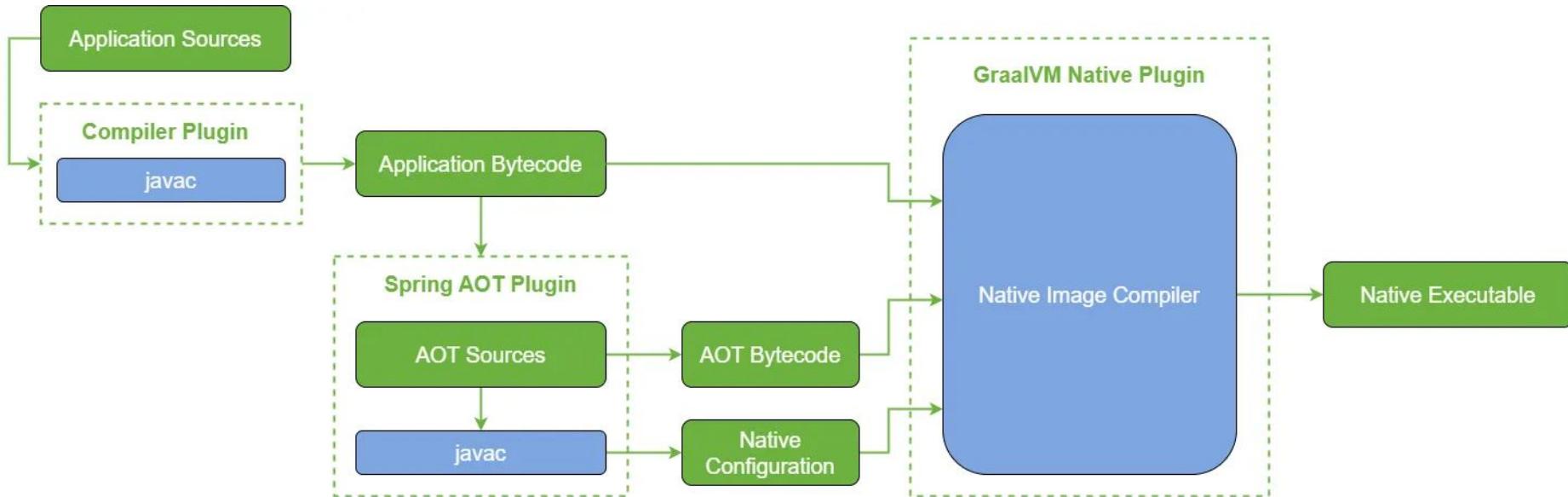
Executable Jar



Native Executable

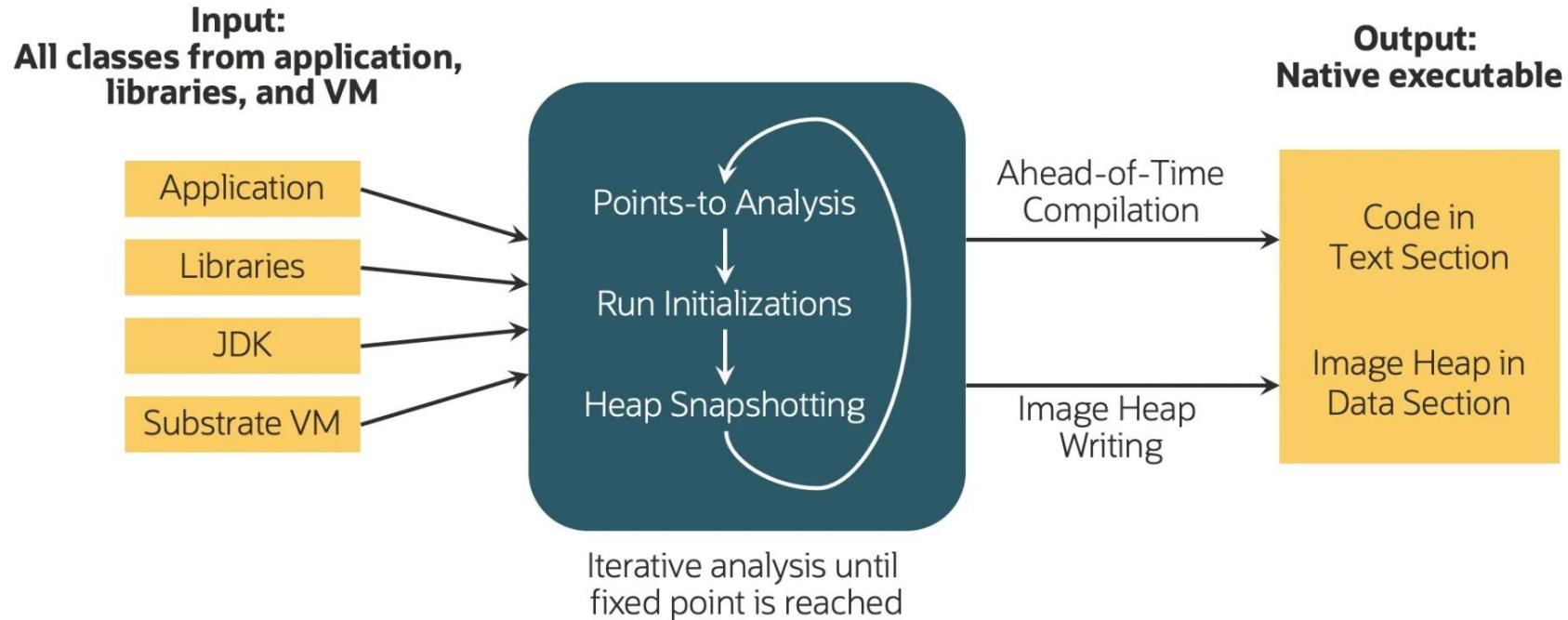


Spring Native 編譯過程



<https://medium.com/mastering-spring-native-and-graalvm-with-kubernetes/spring-native-and-graalvm-guide-1-spring-native-overview-f4db935840fd>

Native Image Compiler



Spring vs. Spring Native

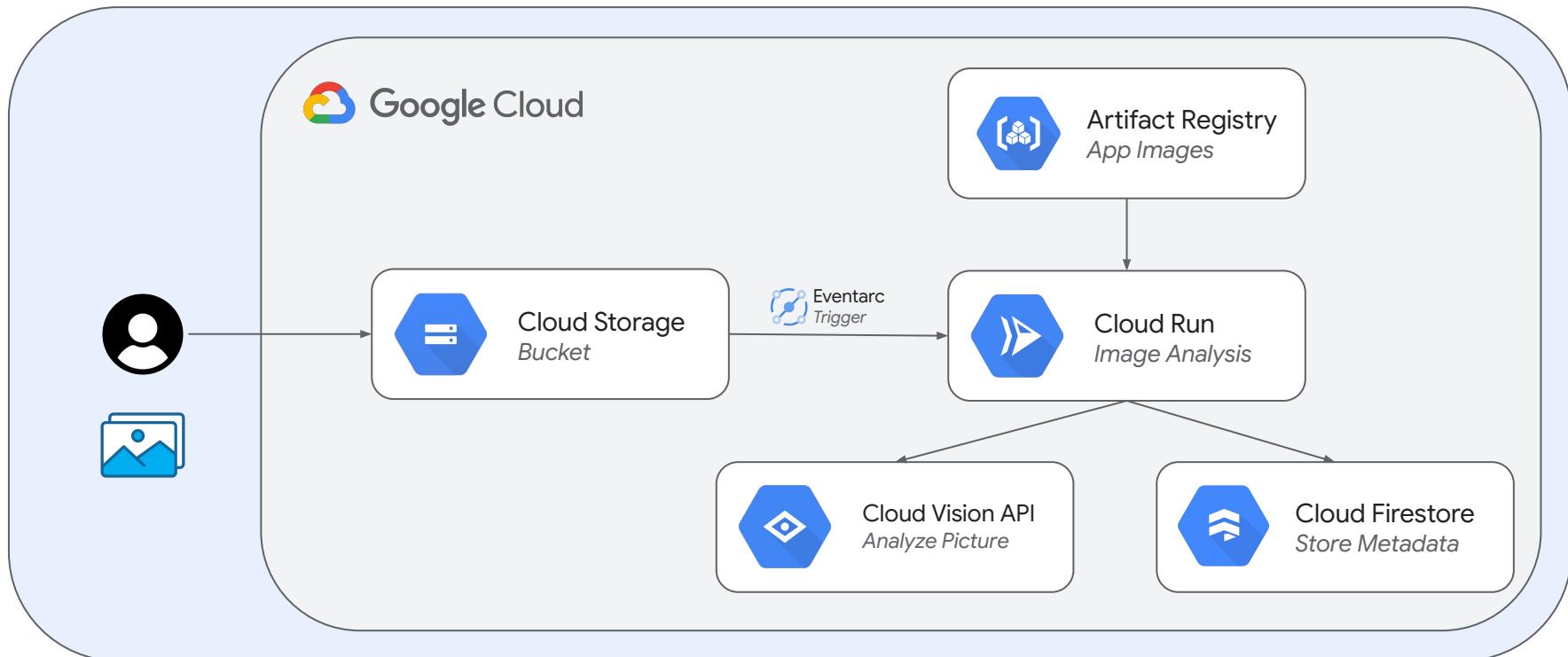
| 特性 | Spring (JVM / JIT) | Spring Native (GraalVM / AOT) |
|-------|----------------------|-------------------------------|
| 編譯方式 | 執行時編譯 (Just-in-Time) | 建構時編譯 (Ahead-of-Time) |
| 啟動速度 | 慢 | 極快 (毫秒級) |
| 記憶體佔用 | 高 | 極低 |
| 映像檔大小 | 大 (包含 JVM) | 小 (僅包含必要程式碼) |
| 編譯時間 | 短 | 長 (需要深度靜態分析) |



02

Lab Intro

Lab 架構概覽



Workshop 流程概覽



環境準備：建立 GCP 專案、儲存桶、資料庫



建構映像檔：分別編譯 JIT 與 Native 兩種版本



部署與觸發：將服務部署到 Cloud Run，並設定 Eventarc 觸發器



驗證與比較：上傳圖片，驗證成果，感受效能差異

環境準備的 3 個提醒

開新 Project 並
啟用 Billing

Google Cloud Select a project ▾

Select a project NEW PROJECT

Search projects and folders

Google Cloud New Project

Project name * My Project 13475

Project ID inbound-analogy-389614 It cannot be changed later. EDIT

Location * BROWSE

Parent organization or folder

CREATE CANCEL

Google Cloud

Bucket 名稱全球唯一
建議名稱加上 GCP專案 ID

Create a bucket

Name your bucket Pick a globally unique, permanent name. [Naming guidelines](#)

uploaded:pictures

Tip: Don't include any sensitive information

CONTINUE

Choose where to store your data

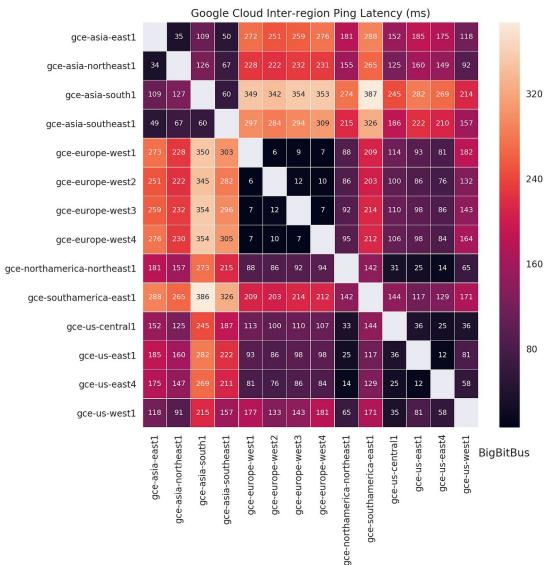
Choose a default storage class for your data

Choose how to control access to objects

Advanced settings (optional)

CREATE CANCEL

各服務 Region (區域) 保持
一致以降低 Latency



Google Cloud

建構映像檔：體驗 JIT 與 Native 的核心差異

```
[INFO] Successfully built image 'docker.io/library/image-analysis-maven-native:latest'  
[INFO]  
[INFO] -----  
[INFO] BUILD SUCCESS  
[INFO] -----  
[INFO] Total time: 10:54 min  
[INFO] Finished at: 2025-10-20T04:28:50Z  
[INFO] -----
```

```
[INFO] Successfully built image 'docker.io/library/image-analysis-maven-jit:latest'  
[INFO]  
[INFO] -----  
[INFO] BUILD SUCCESS  
[INFO] -----  
[INFO] Total time: 01:18 min  
[INFO] Finished at: 2025-10-20T05:37:56Z  
[INFO] -----
```

體會兩種編譯模式的過程與產
出

Note. 後續會將兩種不同的 Docker Image 推送到
Google Artifact Registry

部署與驗證：看見成果

分別部署 image-analysis-jit 和
image-analysis-native 兩個 Cloud Run 服務

✓ image-analysis-jit-service Region: europe-west1 URL: <https://image-analysis-jit-service-1021945198362.europe-west1.run.app> Scaling: Auto (Min: 0)

Observability Revisions Triggers Networking Security YAML

Metrics

Logs Severity Default Filter INFO Search all fields and values

| Severity | Timestamp | Summary |
|----------|-----------------------------|--|
| > * | 2025-10-20 09:54:38.962 HKT | 2025-10-20T01:54:38.963Z INFO 1 --- [main] services.ImageAnalysisApplication : Started ImageAnalysisApplication in 5.754 seconds (process ru... |
| > * | 2025-10-20 09:54:39.070 HKT | 2025-10-20T01:54:39.071Z INFO 1 --- [nio-8080-exec-1] o.a.c.c.C.[Tomcat].[localhost].[/] : Initializing Spring DispatcherServlet 'dispatcherS... |
| > * | 2025-10-20 09:54:39.076 HKT | 2025-10-20T01:54:39.077Z INFO 1 --- [nio-8080-exec-1] o.s.web.servlet.DispatcherServlet : Initializing Servlet 'dispatcherServlet' |
| > * | 2025-10-20 09:54:39.077 HKT | 2025-10-20T01:54:39.078Z INFO 1 --- [nio-8080-exec-1] o.s.web.servlet.DispatcherServlet : Completed initialization in 1 ms |
| > * | 2025-10-20 09:54:39.078 HKT | 2025-10-20T01:54:39.079Z INFO 1 --- [main] services.ImageAnalysisApplication : ImageAnalysisApplication app - Spring Boot FW started: 01:54:... |
| > * | 2025-10-20 09:54:39.080 HKT | 2025-10-20T01:54:39.081Z INFO 1 --- [nio-8080-exec-1] s.e.EventController : EventController : Active processors: 2 |
| > * | 2025-10-20 09:54:39.081 HKT | 2025-10-20T01:54:39.082Z INFO 1 --- [nio-8080-exec-1] s.e.EventController : New picture uploaded llama.jpg |
| > * | 2025-10-20 09:54:39.082 HKT | 2025-10-20T01:54:39.083Z INFO 1 --- [nio-8080-exec-1] s.e.EventController : Calling the Vision API... |
| > * | 2025-10-20 09:54:39.083 HKT | 2025-10-20T01:54:39.084Z INFO 1 --- [nio-8080-exec-1] s.e.EventController : Annotations found: |
| > * | 2025-10-20 09:54:39.084 HKT | 2025-10-20T01:54:39.085Z INFO 1 --- [nio-8080-exec-1] s.e.EventController : - llama |
| > * | 2025-10-20 09:54:39.085 HKT | 2025-10-20T01:54:39.086Z INFO 1 --- [nio-8080-exec-1] s.e.EventController : - Camellia |
| > * | 2025-10-20 09:54:39.086 HKT | 2025-10-20T01:54:39.087Z INFO 1 --- [nio-8080-exec-1] s.e.EventController : - Grass |
| > * | 2025-10-20 09:54:39.087 HKT | 2025-10-20T01:54:39.088Z INFO 1 --- [nio-8080-exec-1] s.e.EventController : - Vertebrate |
| > * | 2025-10-20 09:54:39.088 HKT | 2025-10-20T01:54:39.089Z INFO 1 --- [nio-8080-exec-1] s.e.EventController : - Alpaca |
| > * | 2025-10-20 09:54:39.089 HKT | 2025-10-20T01:54:39.090Z INFO 1 --- [nio-8080-exec-1] s.e.EventController : - Terrestrial animal |
| > * | 2025-10-20 09:54:39.090 HKT | 2025-10-20T01:54:39.091Z INFO 1 --- [nio-8080-exec-1] s.e.EventController : - Fur |

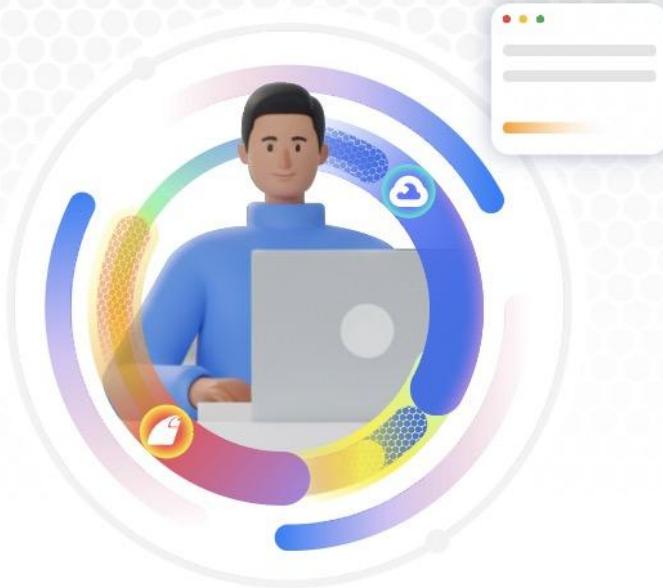
✓ image-analysis-native-service Region: europe-west1 URL: <https://image-analysis-native-service-1021945198362.europe-west1.run.app> Scaling: Auto (Min: 0)

Observability Revisions Triggers Networking Security YAML

Metrics

Logs Severity Default Filter INFO Search all fields and values

| Severity | Timestamp | Summary |
|----------|-----------------------------|--|
| > * | 2025-10-20 09:54:32.707 HKT | 2025-10-20T01:54:32.708Z INFO 1 --- [main] services.ImageAnalysisApplication : Started ImageAnalysisApplication in 0.868 seconds (process ru... |
| > * | 2025-10-20 09:54:32.711 HKT | 2025-10-20T01:54:32.712Z INFO 1 --- [nio-8080-exec-1] o.a.c.c.C.[Tomcat].[localhost].[/] : Initializing Spring DispatcherServlet 'dispatcherS... |
| > * | 2025-10-20 09:54:32.711 HKT | 2025-10-20T01:54:32.712Z INFO 1 --- [nio-8080-exec-1] o.s.web.servlet.DispatcherServlet : Initializing Servlet 'dispatcherServlet' |
| > * | 2025-10-20 09:54:32.712 HKT | 2025-10-20T01:54:32.713Z INFO 1 --- [nio-8080-exec-1] o.s.web.servlet.DispatcherServlet : Completed initialization in 1 ms |
| > * | 2025-10-20 09:54:32.713 HKT | 2025-10-20T01:54:32.714Z INFO 1 --- [main] services.ImageAnalysisApplication : ImageAnalysisApplication app - Spring Boot FW started: 01:54:... |
| > * | 2025-10-20 09:54:32.728 HKT | 2025-10-20T01:54:32.729Z INFO 1 --- [nio-8080-exec-1] s.e.EventController : EventController : Active processors: 2 |
| > * | 2025-10-20 09:54:32.728 HKT | 2025-10-20T01:54:32.729Z INFO 1 --- [nio-8080-exec-1] s.e.EventController : New picture uploaded llama.jpg |
| > * | 2025-10-20 09:54:32.788 HKT | 2025-10-20T01:54:32.789Z INFO 1 --- [nio-8080-exec-1] s.e.EventController : Calling the Vision API... |
| > * | 2025-10-20 09:54:33.172 HKT | 2025-10-20T01:54:33.173Z INFO 1 --- [nio-8080-exec-1] s.e.EventController : Annotations found: |
| > * | 2025-10-20 09:54:33.172 HKT | 2025-10-20T01:54:33.173Z INFO 1 --- [nio-8080-exec-1] s.e.EventController : - llama |
| > * | 2025-10-20 09:54:33.172 HKT | 2025-10-20T01:54:33.173Z INFO 1 --- [nio-8080-exec-1] s.e.EventController : - Camellia |
| > * | 2025-10-20 09:54:33.172 HKT | 2025-10-20T01:54:33.173Z INFO 1 --- [nio-8080-exec-1] s.e.EventController : - Grass |
| > * | 2025-10-20 09:54:33.172 HKT | 2025-10-20T01:54:33.173Z INFO 1 --- [nio-8080-exec-1] s.e.EventController : - Vertebrate |
| > * | 2025-10-20 09:54:33.172 HKT | 2025-10-20T01:54:33.173Z INFO 1 --- [nio-8080-exec-1] s.e.EventController : - Alpaca |
| > * | 2025-10-20 09:54:33.172 HKT | 2025-10-20T01:54:33.173Z INFO 1 --- [nio-8080-exec-1] s.e.EventController : - Terrestrial animal |
| > * | 2025-10-20 09:54:33.172 HKT | 2025-10-20T01:54:33.173Z INFO 1 --- [nio-8080-exec-1] s.e.EventController : - Fur |



**Build your AI Agents
with Master Concept**

歡迎報名 AI Agents 實作工作坊

11/28 (五) 13:50 - 15:20

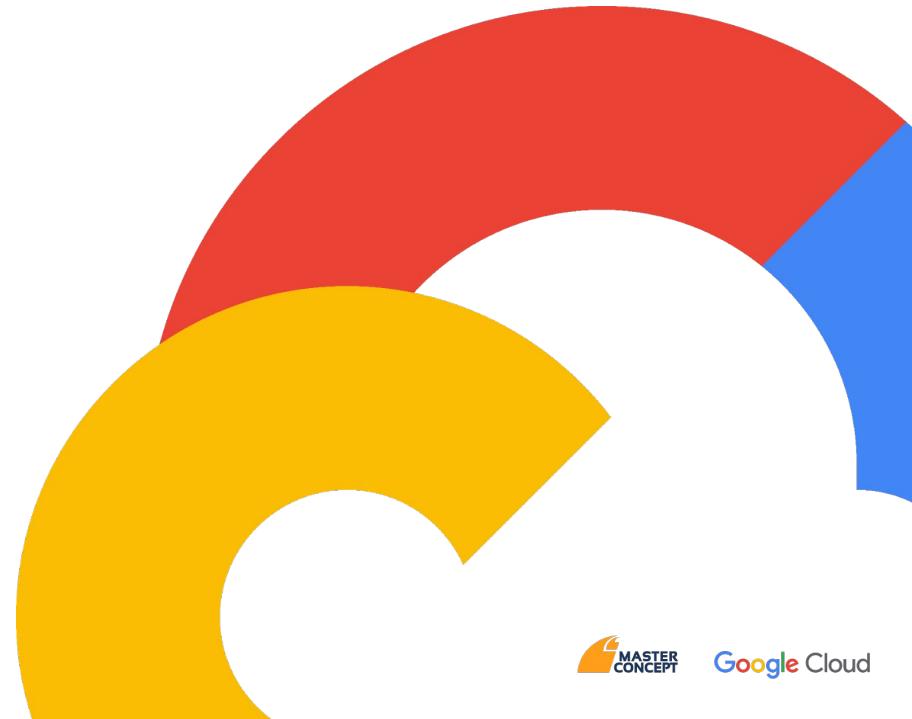
@台北喜來登大飯店 B2 祿廳



03

Let's Build!

Google Cloud



1 概述 & 架構說明

2 前置準備

3 Google Cloud 認證設定

4 建立 Google Cloud Storage

5 建立 Firestore 資料庫

6 瞭解程式碼

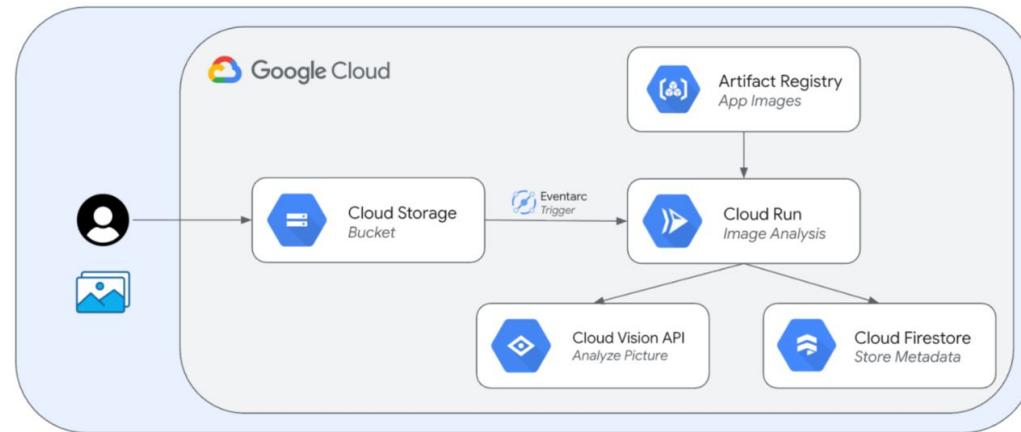
7 本地建置與測試 (JIT 版本)

8 本地建置與測試 (Native 版本)

9 比較 JIT vs Native

10 部署到 Cloud Run (JIT 版本)

架構圖



應用程式流程：

1. 使用者上傳圖片到 Cloud Storage
2. Cloud Storage 觸發 Eventarc 事件
3. Eventarc 呼叫 Cloud Run 服務
4. Cloud Run 服務使用 Vision API 分析圖片
5. 分析結果儲存到 Firestore

