

TAIPEI

DEV DAY



12.04.20

Technology Selection: Amazon ECS Launch Types: Fargate vs. EC2

HC Lo
Solutions Architect
AWS

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Integration at PAFERS Tech
AWS Community Hero



Agenda

Technology Selection

Overview Amazon ECS

Amazon ECS Launch Type Comparison

Opening (0/0)

有些問題，
不是選擇 EC2/Fargate Launch Type 之後，
就能解決。

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About



Ernest Chiang

Worked on process integration engineering in semiconductor industry @tsmc.

Doing product and technology integration in fitness industry @pafers. #bluetooth

Off Work AWS Community Hero. TGONetworks Taipei. COSCUP. Mozillian. AIESECer.



PAFERS Fitness Services (PFS)

The integrated products and services for fitness.

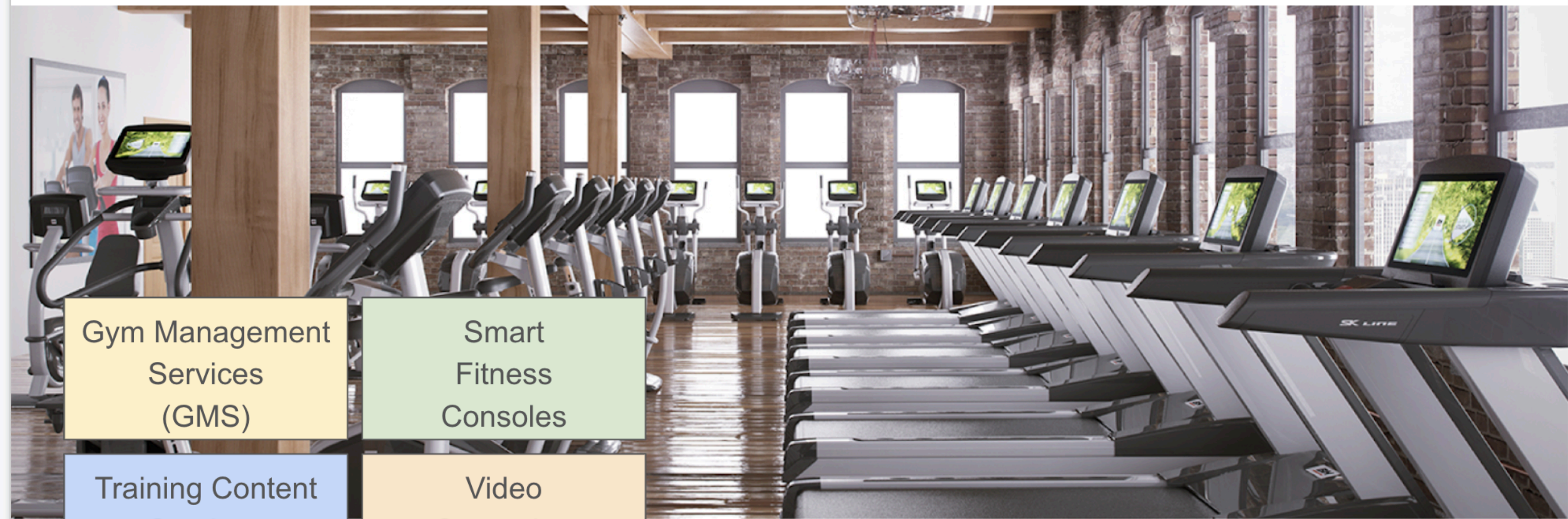


Gym Management
Services
(GMS)

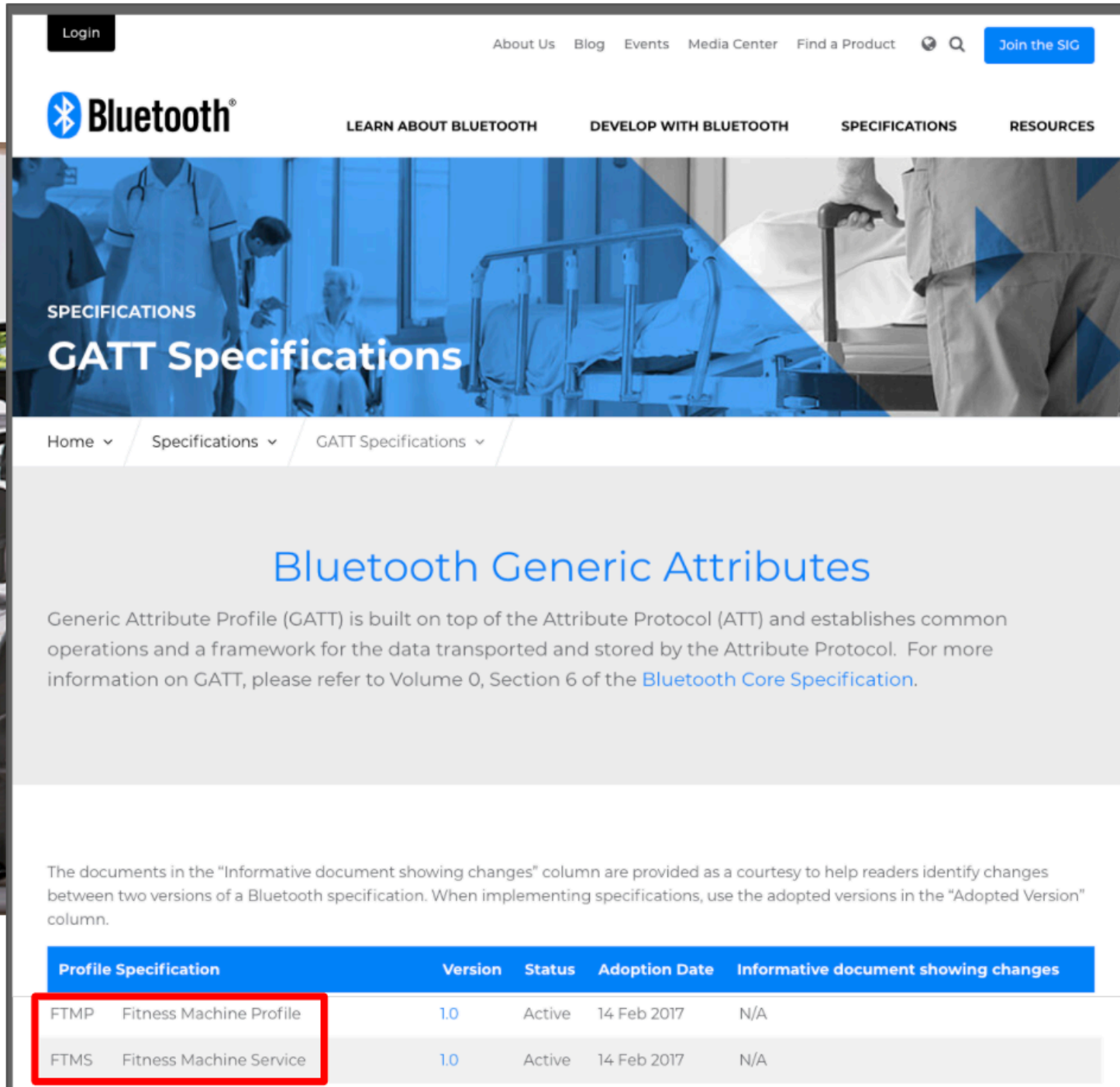
Smart
Fitness
Consoles

Training Content
Services
(TCS)

Video
Streaming
Services



PAFERS Contributes Industry Knowledge to Bluetooth Spec



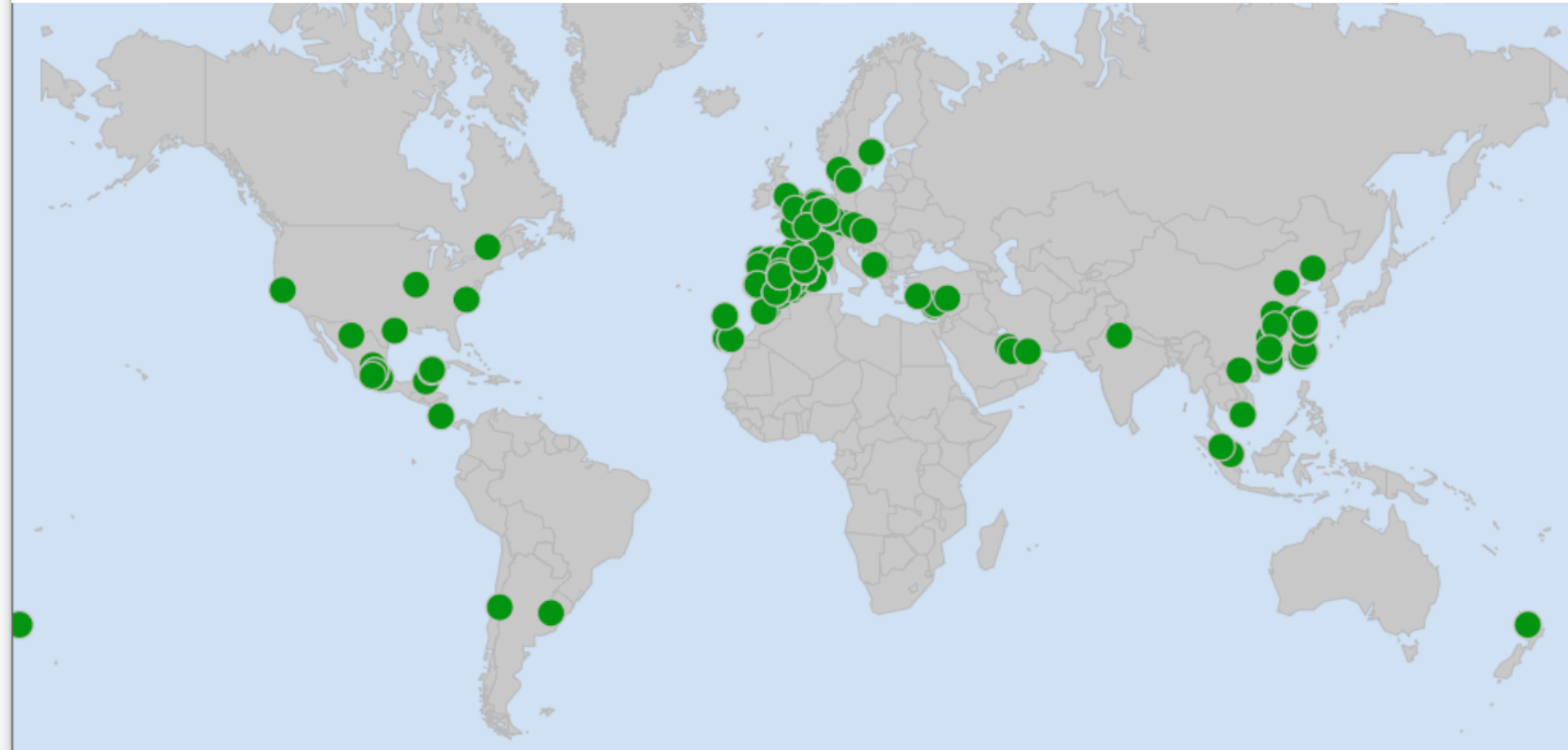
The screenshot shows the Bluetooth website's 'GATT Specifications' page. The header includes the Bluetooth logo and navigation links: 'LEARN ABOUT BLUETOOTH', 'DEVELOP WITH BLUETOOTH', 'SPECIFICATIONS', and 'RESOURCES'. A blue banner at the top reads 'SPECIFICATIONS GATT Specifications'. Below this, a breadcrumb trail shows 'Home > Specifications > GATT Specifications'. The main heading is 'Bluetooth Generic Attributes'. A paragraph explains that the Generic Attribute Profile (GATT) is built on top of the Attribute Protocol (ATT) and establishes common operations and a framework for data transport and storage. It references Volume 0, Section 6 of the Bluetooth Core Specification. Below this, a note states that documents in the 'Informative document showing changes' column are provided as a courtesy to help readers identify changes between two versions of a Bluetooth specification. At the bottom, a table lists Bluetooth profiles and services, with the 'FTMP' and 'FTMS' rows highlighted by a red box.

Profile Specification	Version	Status	Adoption Date	Informative document showing changes
FTMP Fitness Machine Profile	1.0	Active	14 Feb 2017	N/A
FTMS Fitness Machine Service	1.0	Active	14 Feb 2017	N/A



<https://www.bluetooth.com/specifications/gatt/>

Global PAFERS Edges Footprints



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Technology Selection



Preparation (0/2)

今日分享
比較傳產
若太**土砲**
還請見諒

Preparation (1/2)

目的 想要/希望/要



方法 會不會/能不能/知不知道/可不可以

Preparation (2/2)

主詞

+

動詞

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燒烤式選型法



Selection (1/1)

想像
環境
拆解
選擇
目的

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燒烤式選型法 想像



Imagination (0/1)

說雲端太遙遠
聊美食好上手
說得一口好菜
聊了一朵好雲

Imagination (1/1)

邀請大家
想像一下

Goal

選擇一種燒烤店類型吃牛排

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燒烤式選型法 環境



Environment (0/16)

這樣介紹可能會被主辦單位說不行

-- 因為可能只有標題寫到 Fargate (被打

但是可能未來會吸引燒烤店贊助商

-- 自我揭露: ex-Sponsorship Team of COSCUP

Environment (1/16)

燒烤店

- 四人桌
- 烤爐
- 烤盤
- 熱源
- 兩公分厚牛排
- 自己動手烤


Environment (2/16)

燒烤店 Type A

- 四人桌
- 烤爐
- 烤盤
- 熱源
- 兩公分厚牛排
- 自己動手烤


Environment (3/16)

燒烤店 彈性燒烤 Type

- 四人桌
 - 烤爐
 - 烤盤
 - 熱源
 - 兩公分厚牛排
 - 自己動手烤經常烤焦
- 

Environment (4/16)

燒烤店 彈性烤了又烤 Type

- 四人桌
 - 烤爐
 - 烤盤
 - 熱源
 - 兩公分厚牛排
 - 自己動手烤 經常烤焦
- 

Environment (5/16)

燒烤店 Elastic Cow 了又 Cow Type

- 四人桌
- 烤爐
- 烤盤
- 熱源
- 兩公分厚牛排
- 自己動手烤

Environment (6/16)

燒烤店 EC2 Type

- 四人桌
- 烤爐
- 烤盤
- 熱源
- 兩公分厚牛排
- 自己動手烤

Environment (7/16)

燒烤店 EC2 Type

- 四人桌
- 烤爐
- 烤盤
- 熱源
- 兩公分厚牛排
- 自己動手烤

燒烤店

- 吧台
- 烤爐
- 烤盤
- 熱源
- 兩公分厚牛排
- 服務人員烤+陪聊

Environment (8/16)

燒烤店 **EC2 Type**

- 四人桌
- 烤爐
- 烤盤
- 熱源
- 兩公分厚牛排
- 自己動手烤

燒烤店 **Type B**

- 吧台
- 烤爐
- 烤盤
- 熱源
- 兩公分厚牛排
- 服務人員烤+陪聊

Environment (9/16)

燒烤店 EC2 Type

- 四人桌
- 烤爐
- 烤盤
- 熱源
- 兩公分厚牛排
- 自己動手烤

燒烤店 自在燒烤 Type

- 吧台
- 烤爐
- 烤盤
- 熱源
- 兩公分厚牛排
- 服務人員烤+陪聊

Environment (10/16)

燒烤店 EC2 Type

- 四人桌
- 烤爐
- 烤盤
- 熱源
- 兩公分厚牛排
- 自己動手烤

燒烤店 自在燒烤 Type

- 吧台
- 烤爐
- 烤盤
- 熱源
- 兩公分厚牛排
- 服務人員烤+陪聊

(通常吧台店面屬於狹長型)

Environment (11/16)

燒烤店 EC2 Type

- 四人桌
- 烤爐
- 烤盤
- 熱源
- 兩公分厚牛排
- 自己動手烤

燒烤店 自在燒烤 Type

- 吧台
- 烤爐
- 烤盤
- 熱源
- 兩公分厚牛排
- 服務人員烤+陪聊

(坐在門口位置比較容易被打擾)

Environment (12/16)

燒烤店 EC2 Type

- 四人桌
- 烤爐
- 烤盤
- 熱源
- 兩公分厚牛排
- 自己動手烤

燒烤店 自在燒烤 Type

- 吧台
- 烤爐
- 烤盤
- 熱源
- 兩公分厚牛排
- 服務人員烤+陪聊

(老闆請問還有位置嗎?)

Environment (13/16)

燒烤店 EC2 Type

- 四人桌
- 烤爐
- 烤盤
- 熱源
- 兩公分厚牛排
- 自己動手烤

燒烤店 自在燒烤 Type

- 吧台
- 烤爐
- 烤盤
- 熱源
- 兩公分厚牛排
- 服務人員烤+陪聊

(或是冬天容易冷風一陣一陣...)

Environment (14/16)

燒烤店 EC2 Type

- 四人桌
- 烤爐
- 烤盤
- 熱源
- 兩公分厚牛排
- 自己動手烤

燒烤店 自在燒烤 Type

- 吧台
- 烤爐
- 烤盤
- 熱源
- 兩公分厚牛排
- 服務人員烤+陪聊

(經過一陣校調之後...)

Environment (15/16)

燒烤店 EC2 Type

- 四人桌
- 烤爐
- 烤盤
- 熱源
- 兩公分厚牛排
- 自己動手烤

燒烤店 Far Gate Type

- 吧台
- 烤爐
- 烤盤
- 熱源
- 兩公分厚牛排
- 服務人員烤+陪聊

(讓我們坐在離門遠一些的位置...)

Environment (16/16)

燒烤店 **EC2 Type**

- 四人桌
- 烤爐
- 烤盤
- 熱源
- 兩公分厚牛排
- 自己動手烤

燒烤店 **Fargate Type**

- 吧台
- 烤爐
- 烤盤
- 熱源
- 兩公分厚牛排
- 服務人員烤+陪聊

Goal (Keep remind)

選擇一種燒烤店類型吃牛排

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燒烤式選型法 拆解



Factors (1/8)

變因

-- Factors/嘔吐法/限制條件/邊界條件

Factors (2/8)

烤爐

-- 品牌/尺寸/材質/大小/導熱性/通風性/熱流/氣流

Factors (3/8)

烤爐

-- 品牌/尺寸/材質/大小/導熱性/通風性/熱流/氣流

烤盤

-- 位置/形狀/品牌/尺寸/材質/大小/高度/溫度/沾黏

Factors (4/8)

烤爐

-- 品牌/尺寸/材質/大小/導熱性/通風性/熱流/氣流

烤盤

-- 位置/形狀/品牌/尺寸/材質/大小/高度/溫度/沾黏

熱源

-- 木炭/瓦斯/原子炭/龍眼木炭/荔枝木炭/炭精/被長嘆(咦)

Factors (5/8)

食材

-- 牛排/厚度/部位/產地/儲藏/醃製/時間/熟成/處理

Factors (6/8)

食材

-- 牛排/厚度/部位/產地/儲藏/醃製/時間/熟成/處理

製程

-- 前製程/灑鹽/奶油/迷迭香/溫度/直火/間接火/先高後低/\

-- LowAndSlow/後製程/靜置/時間

Goal (Keep remind)

選擇一種燒烤店類型吃牛排

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燒烤式選型法 選擇



Selection (0/8)

小孩子才做選擇，大人全部都要
每個大人，心裡都住著一個孩子
-- do chi?

Selection (1/8)

客觀條件

主觀條件

Selection (2/8)

客觀條件: Factors 展開表/比較表/...

主觀條件

Selection (3/8)

客觀條件: Factors 展開表/比較表/...

主觀條件: 蛤？

Selection (4/8)

客觀條件: 對 v 拆解

主觀條件: 對 s 拆解

Selection (5/8)

客觀條件: 對 v 拆解 \rightarrow 由外/而內

主觀條件: 對 s 拆解

Selection (6/8)

客觀條件: 對 v 拆解 \rightarrow 由外/而內

主觀條件: 對 s 拆解 \rightarrow 能力/時間

Selection (7/8)

客觀條件: 對 v 拆解 \rightarrow 由外/而內

主觀條件: 對 s 拆解 \rightarrow 能力/時間

場景

Selection (8/8)

客觀條件: 技術項目/內外的 變因 展開表/比較表/...

主觀條件: 團隊能力/時間的 變因 展開表/比較表/...

場景

Factors (6/8)

食材

-- 牛排/厚度/部位/產地/儲藏/醃製/時間/熟成/處理

製程

-- 前製程/灑鹽/奶油/迷迭香/溫度/直火/間接火/先高後低/\

-- LowAndSlow/後製程/靜置/時間

Factors (7/8)

食材

-- 牛排/厚度/部位/產地/儲藏/醃製/時間/熟成/處理

製程

-- 前製程/灑鹽/奶油/迷迭香/溫度/直火/間接火/先高後低/\

-- LowAndSlow/後製程/靜置/時間

烹飪者

-- 能力/專長/經驗/熟練度/時間/意願

Factors (8/8)

食材

-- 牛排/厚度/部位/產地/儲藏/醃製/時間/熟成/處理

製程

-- 前製程/灑鹽/奶油/迷迭香/溫度/直火/間接火/先高後低/\

-- LowAndSlow/後製程/靜置/時間

烹飪者

-- 能力/專長/經驗/熟練度/時間/意願

成本

-- 度量衡/單位/換算/風險

Goal (Keep remind)

選擇一種燒烤店類型吃牛排

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燒烤式選型法 目的



Objective (1/1)

我想要品嚐美味的牛排
我想要體驗燒烤的樂趣
我想要享受相聚的時光

Goal (Modified)

我/我們 選擇一種燒烤店類型吃牛排

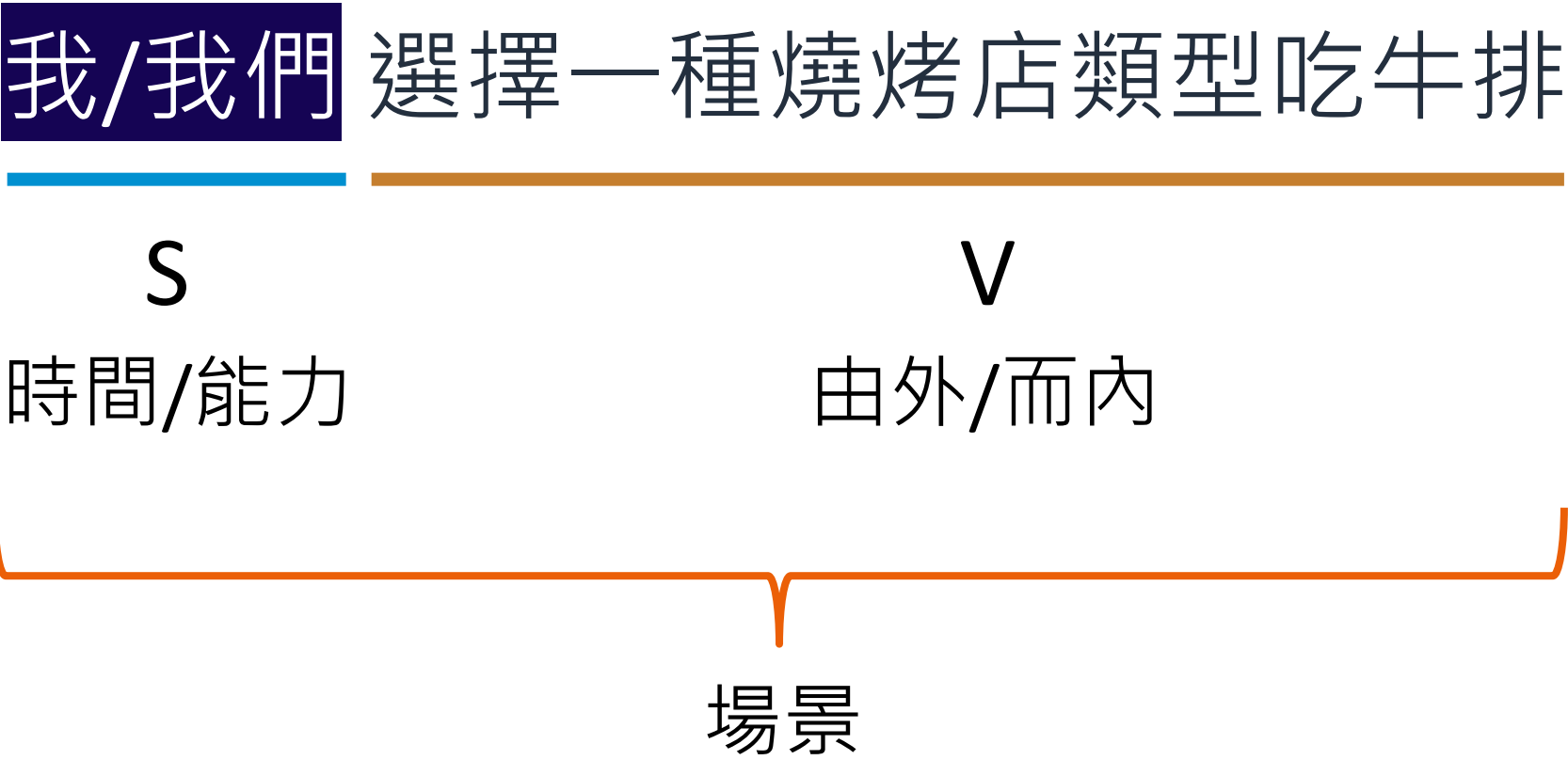
Goal (Modified)

我/我們 選擇一種燒烤店類型吃牛排

S

V

Goal (Modified)



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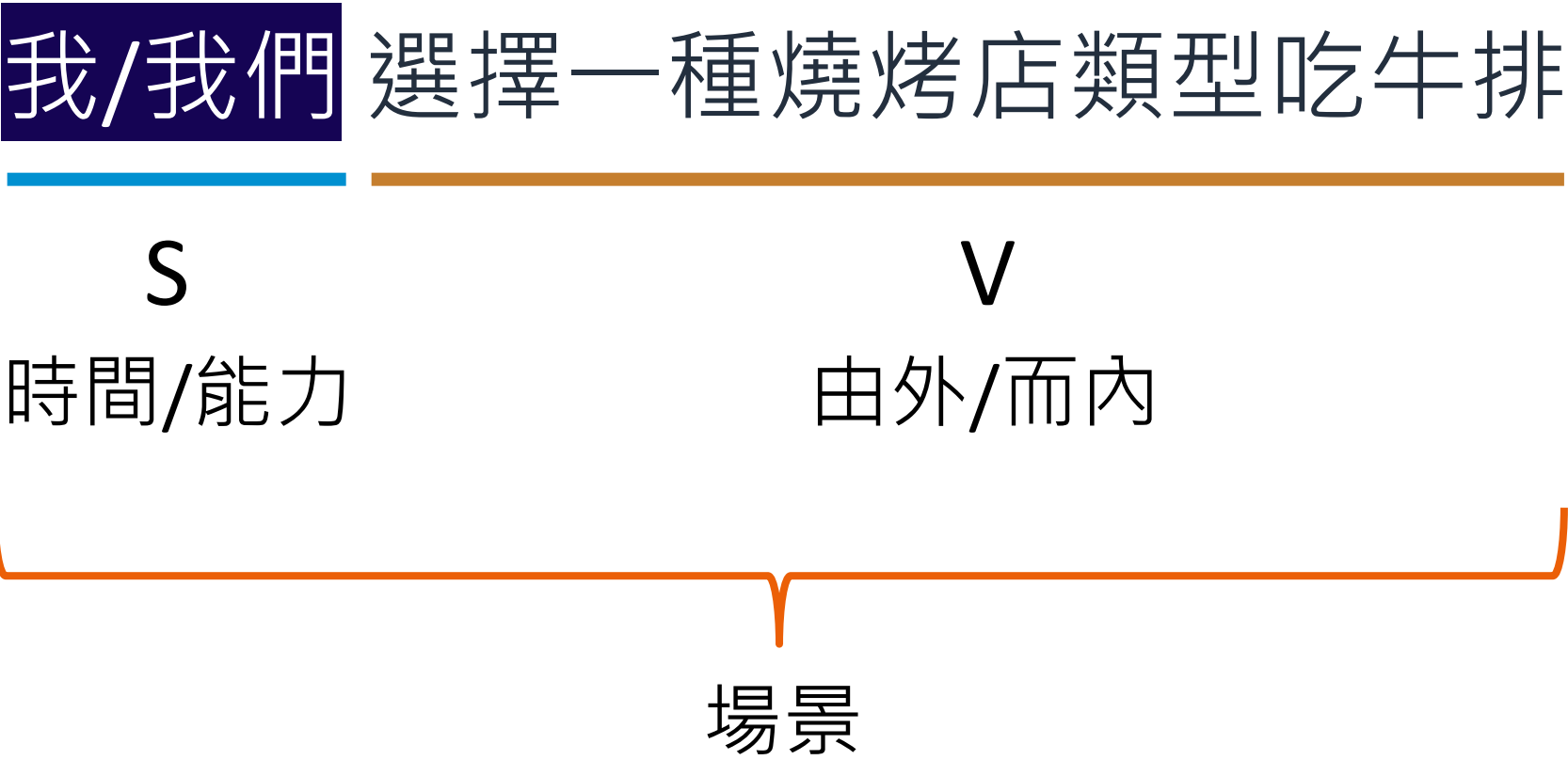
燒烤式選型法 小結



Selection

1. 環境
2. 拆解
3. 選擇
4. 目的
5. 迭代

Goal (Modified)



Goal (Today's topic)

我/我們 選擇一種 Launch Type 跑程式

S

時間/能力

V

由外/而內

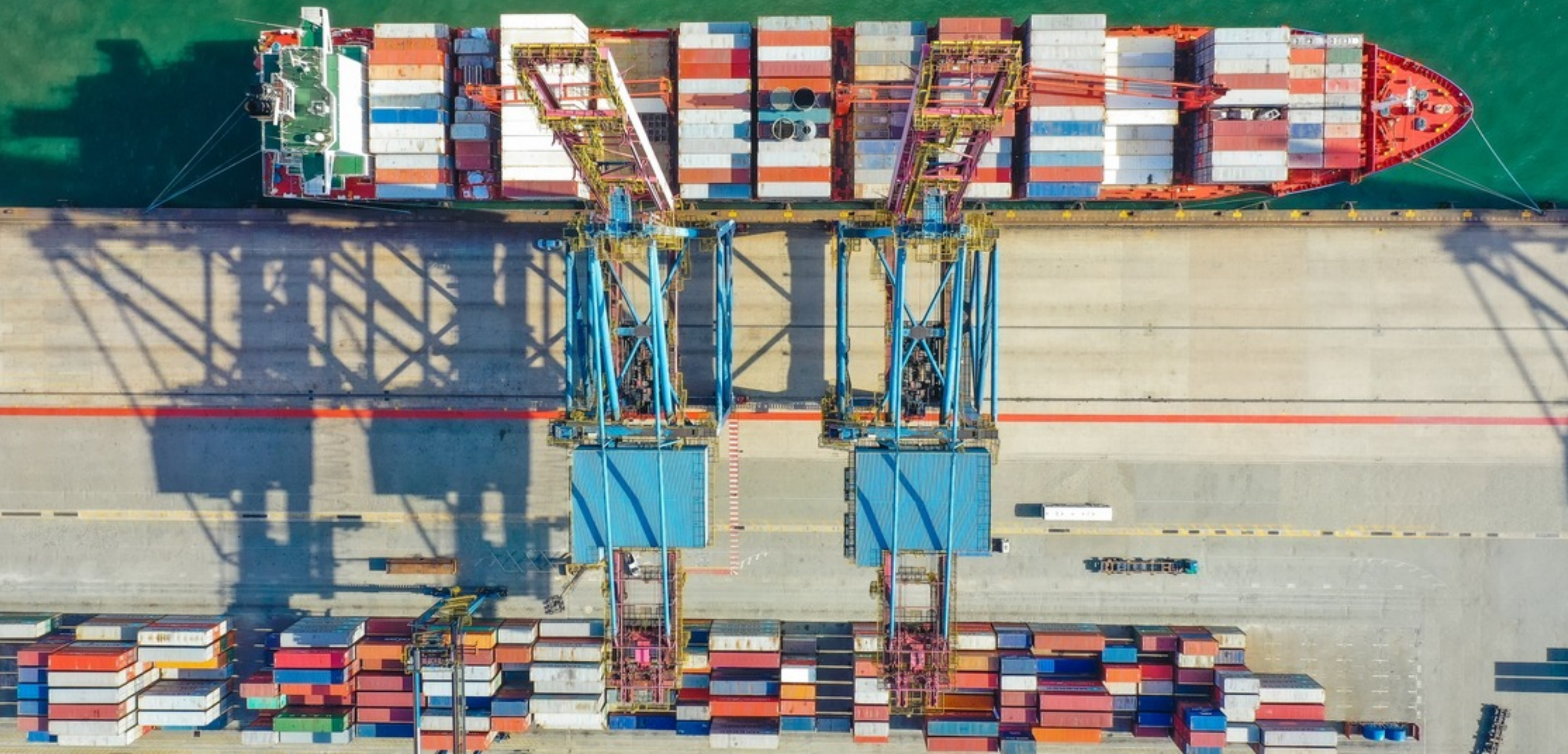
場景

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Overview Amazon ECS



Amazon ECS



Amazon ECS

Amazon EC2 Container Service (2015)

Amazon Elastic Container Service (present)

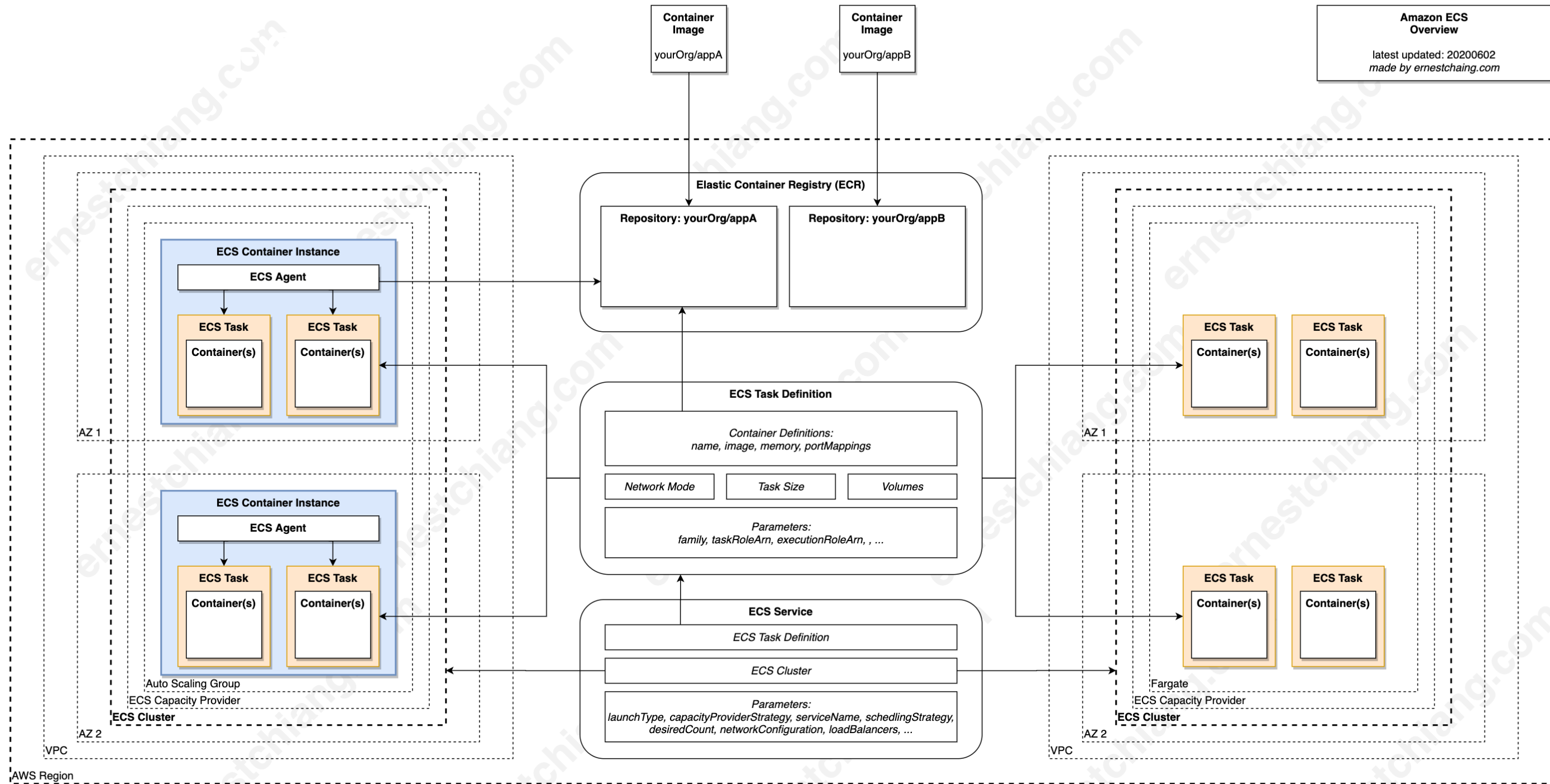
Amazon ECS

Amazon EC2 Container Service (2015)

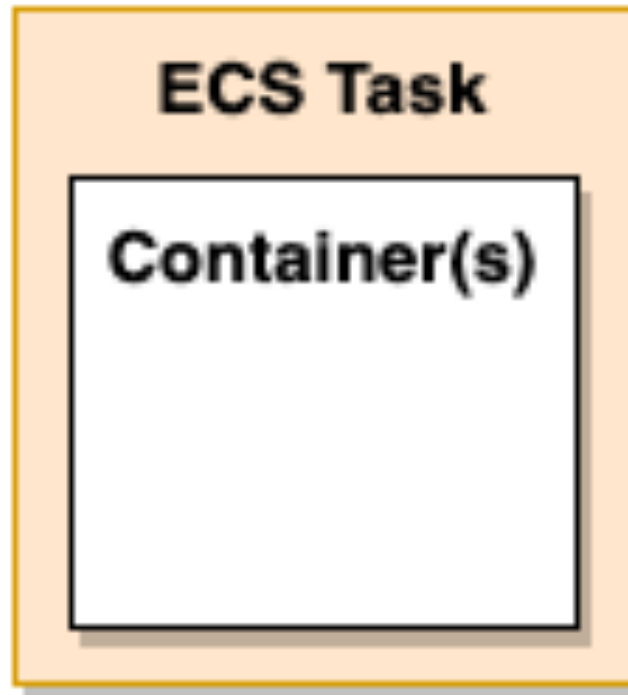
Amazon Elastic Container Service (present)

- EC2 Launch Type

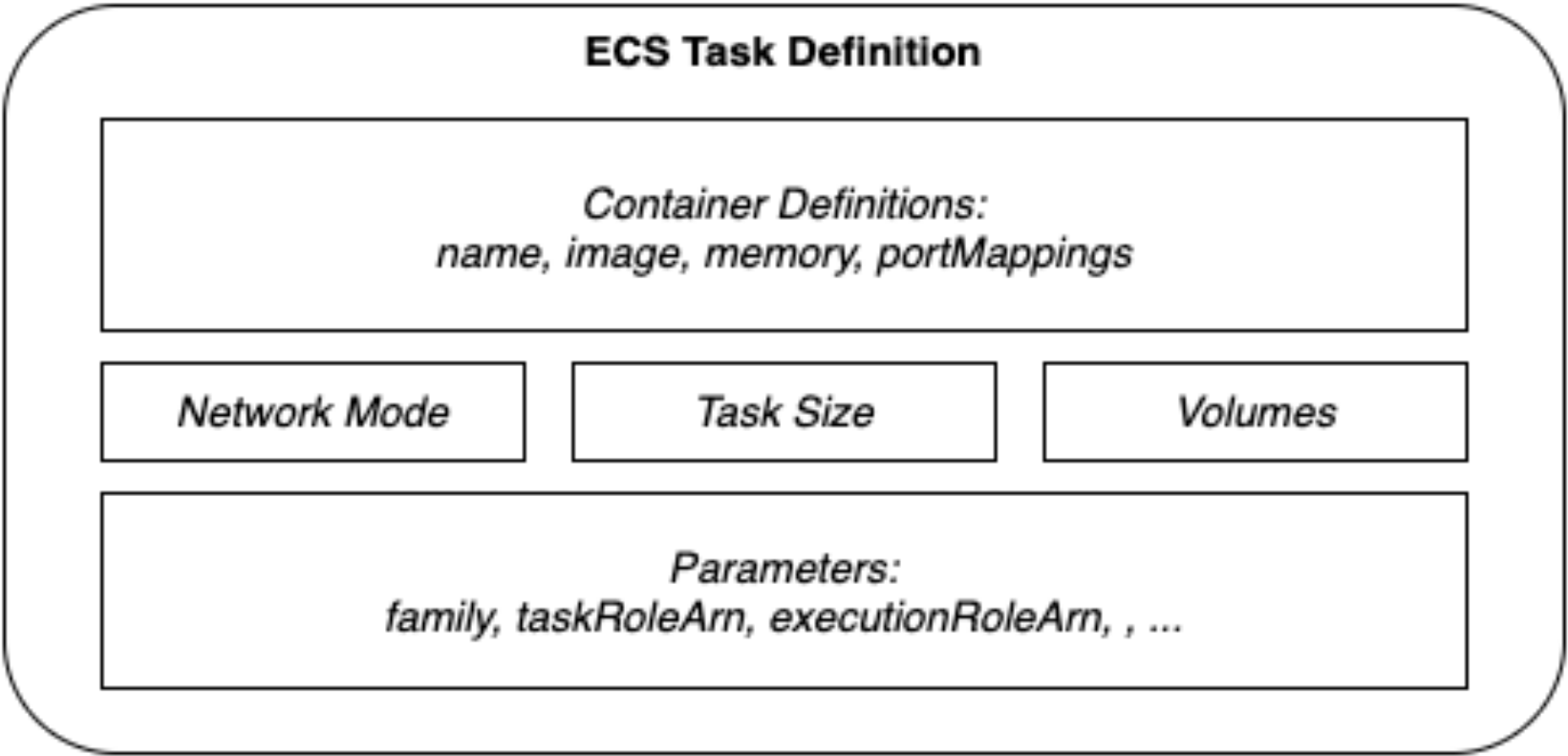
- Fargate Launch Type



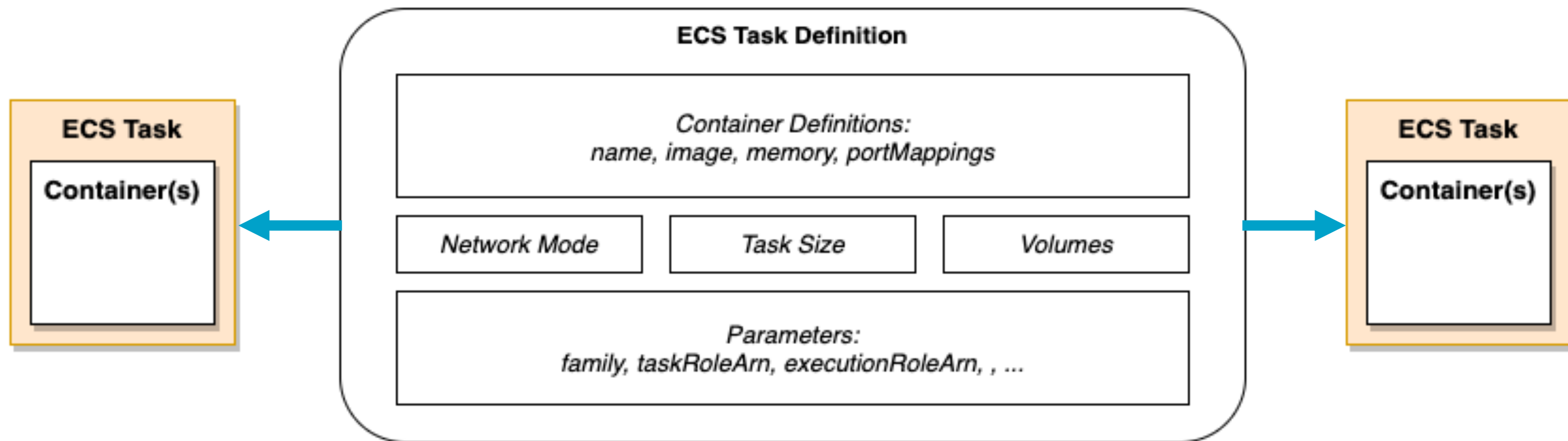
ECS Task



ECS Task Definition



ECS Task Definition → ECS Task



Ref: Ernest's Amazon ECS Study Notes



Goal (Today's topic)

我/我們 選擇一種 Launch Type 跑程式

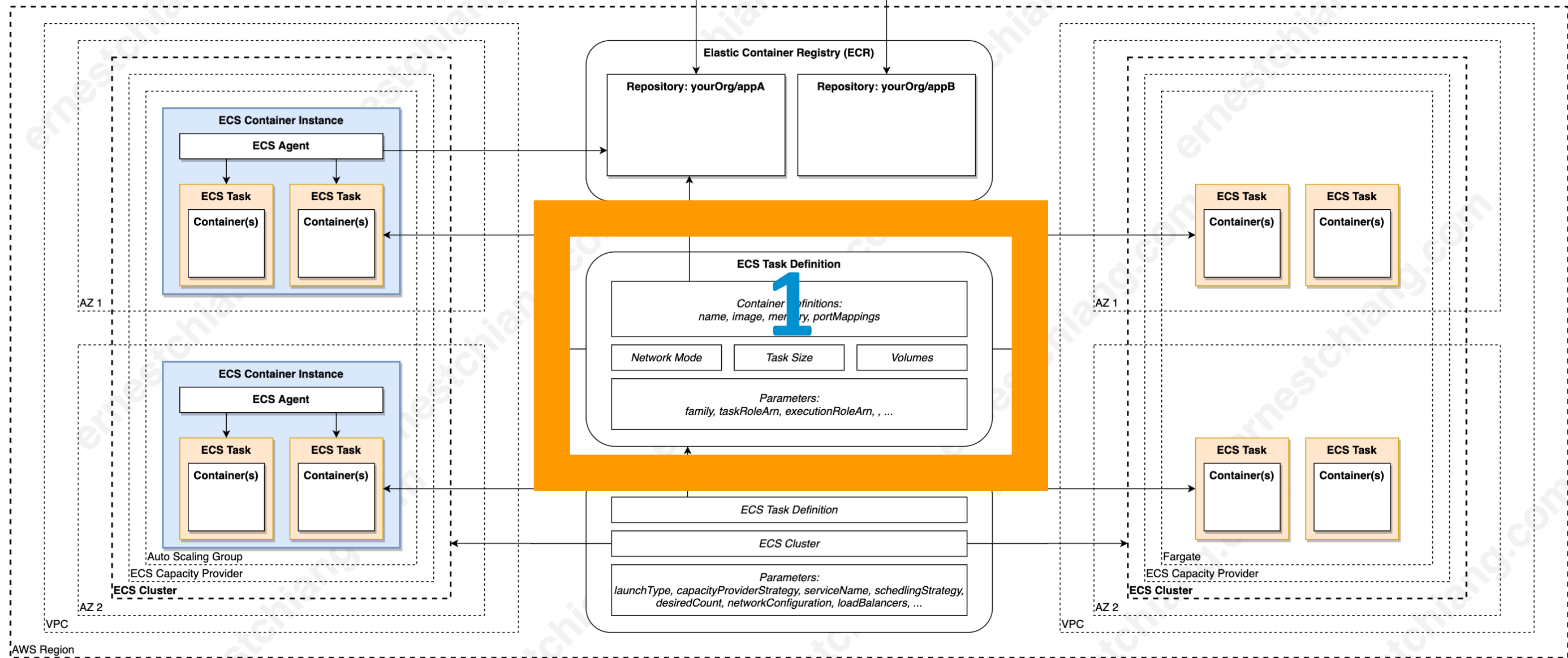
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Overview Amazon ECS

Run Tasks in Clusters



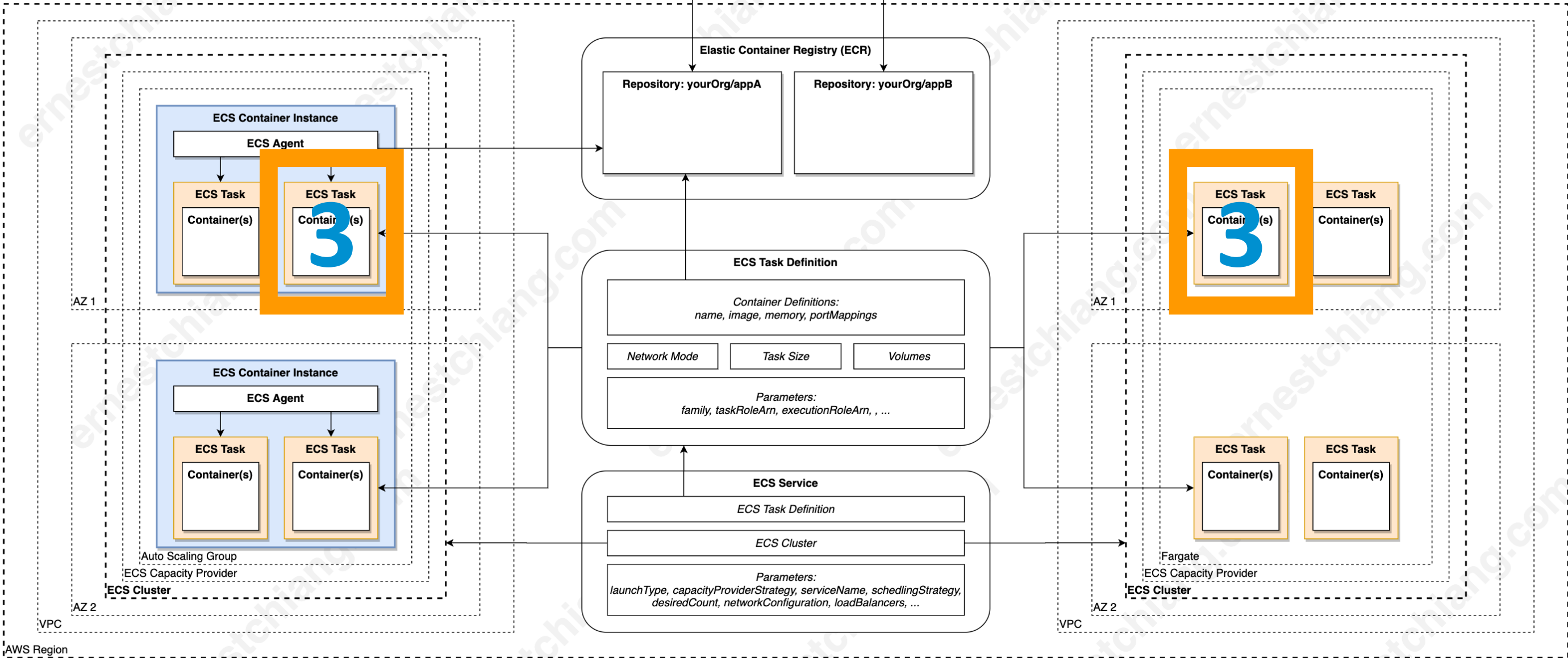
1. Register Task Definition



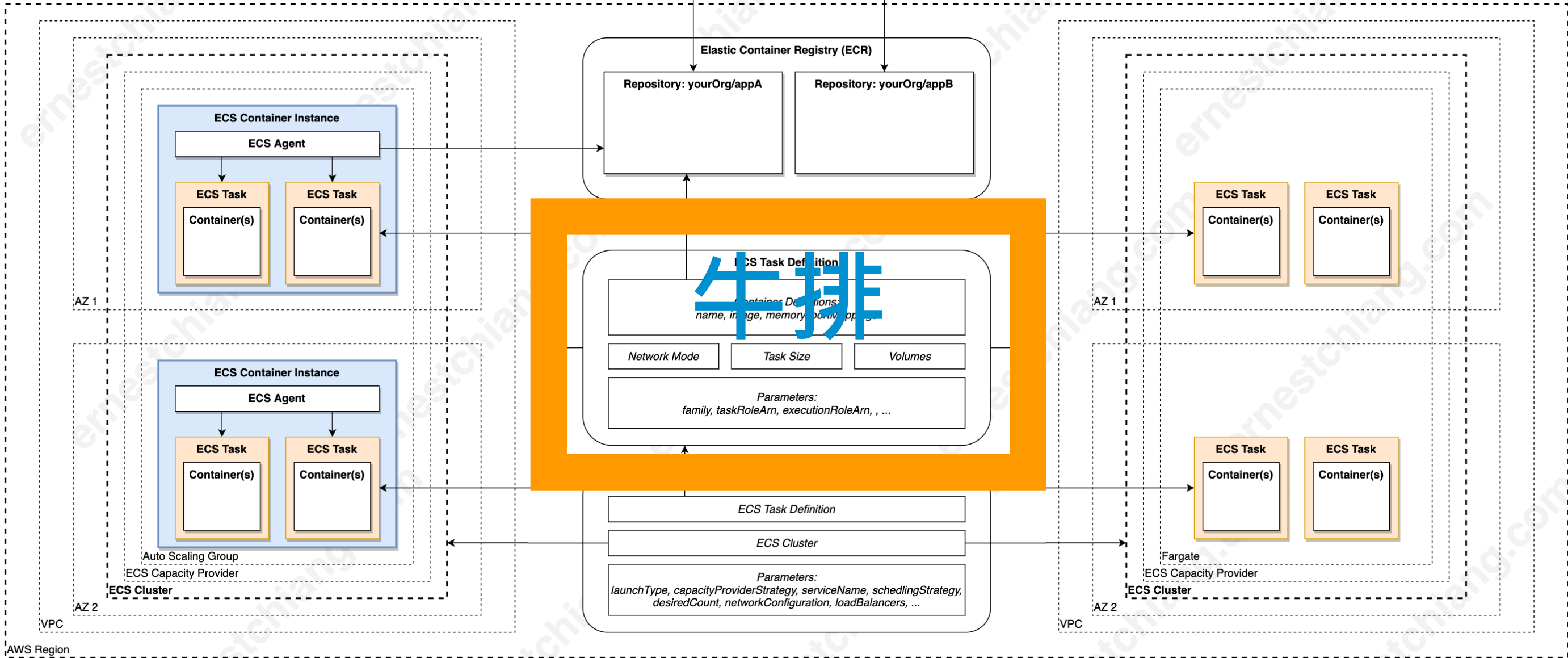
2. Create Cluster



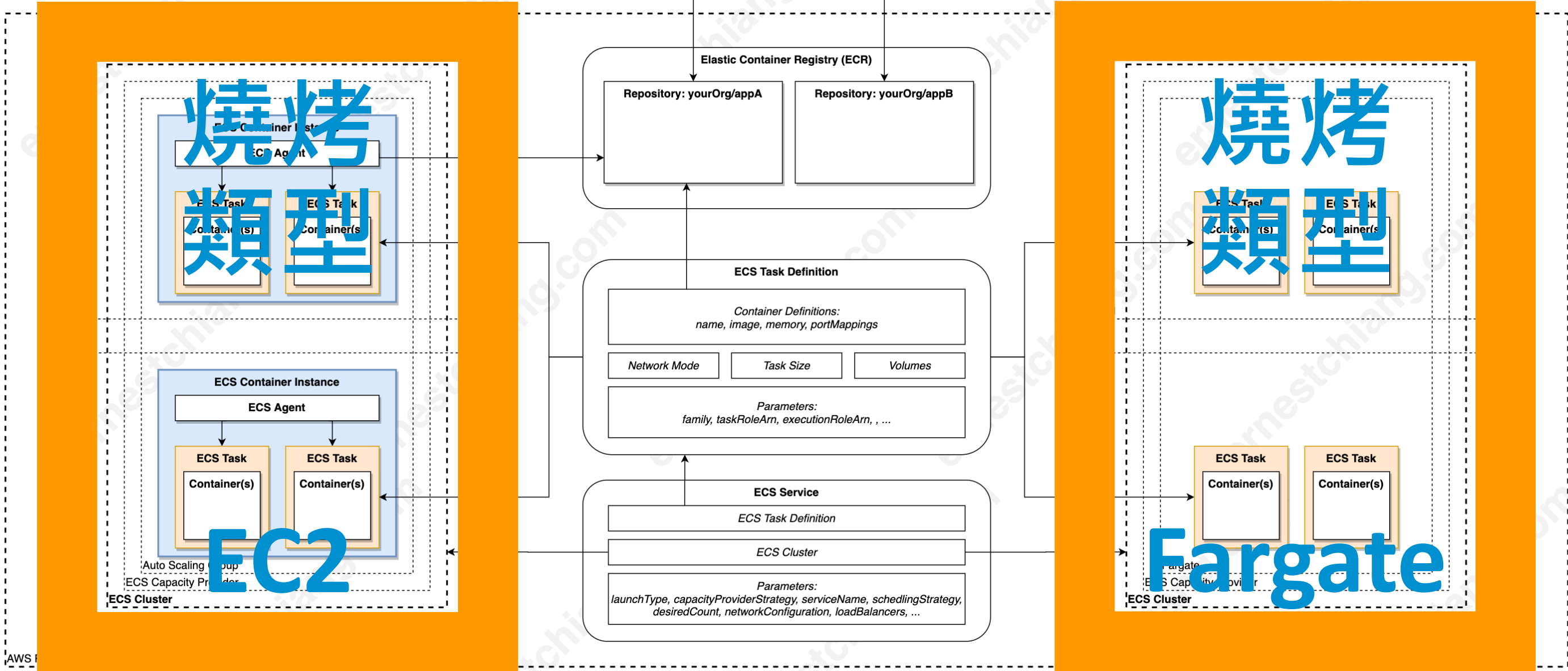
3. Run Tasks



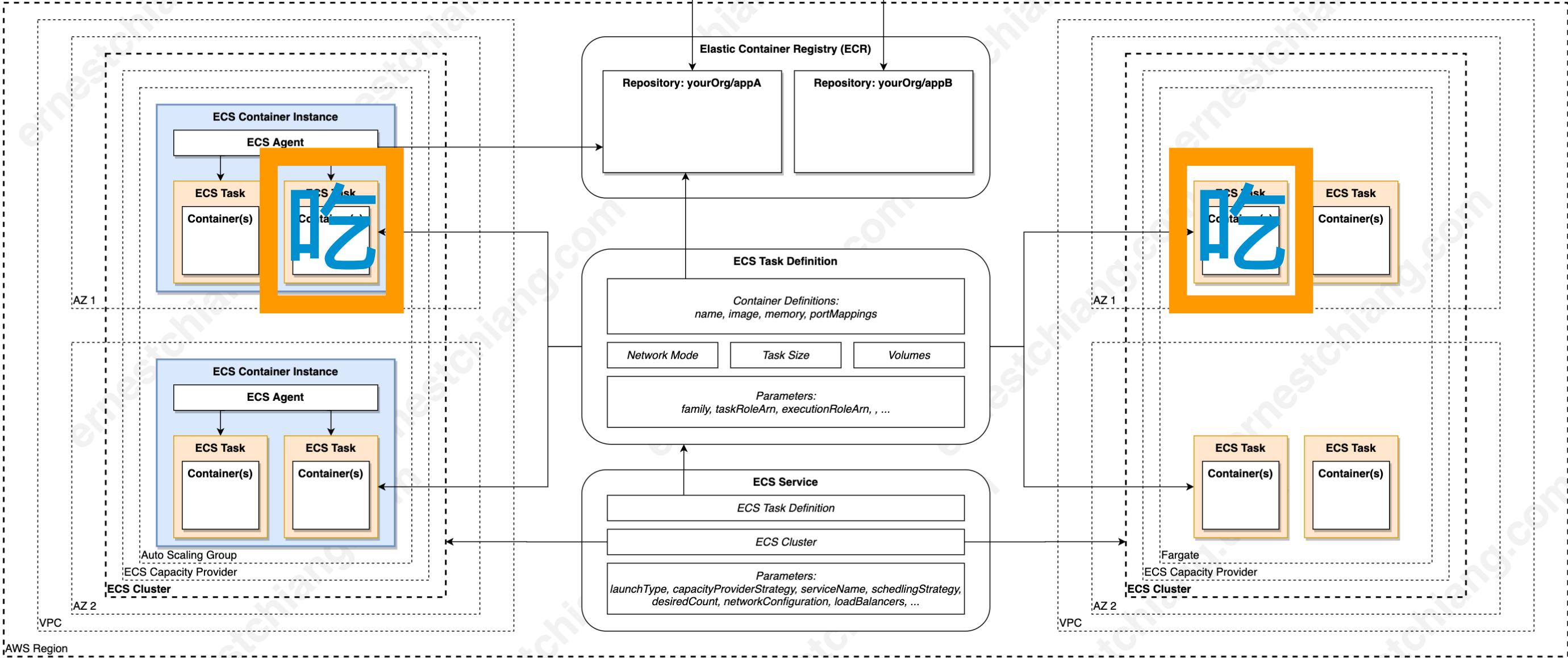
1. Register Task Definition



2. Create Cluster



3. Run Tasks



Goal (Today's topic)

我/我們 選擇一種 Launch Type 跑程式

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Comparison



Comparison

客觀條件: 對 v 拆解 \rightarrow 由外/而內

主觀條件: 對 s 拆解 \rightarrow 能力/時間

場景

Comparison

客觀條件: 技術項目/內外的 變因 展開表/比較表/...

主觀條件: 團隊能力/時間的 變因 展開表/比較表/...

場景

Comparison

由外/而內

能力/時間



場景

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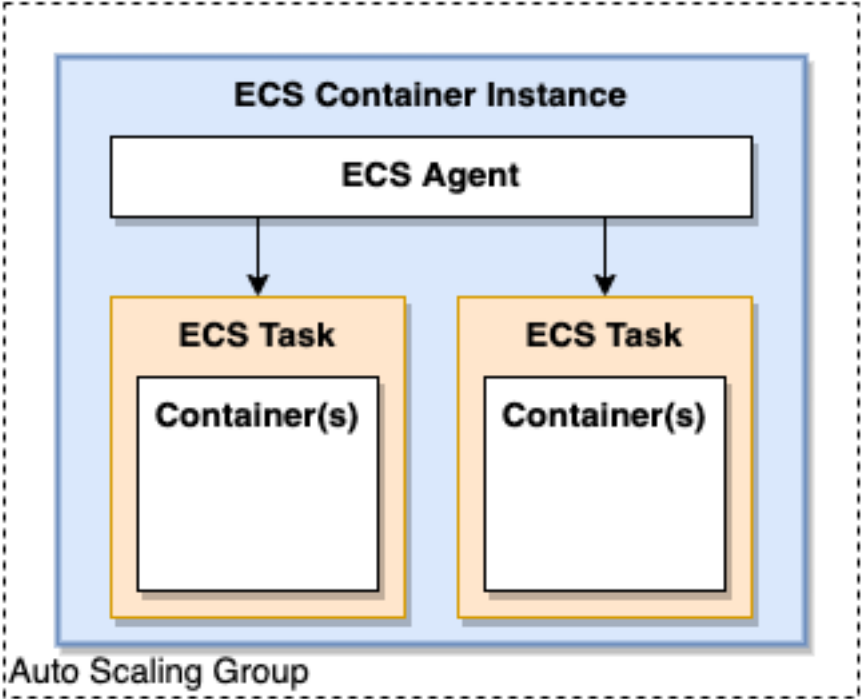
Comparison

由外

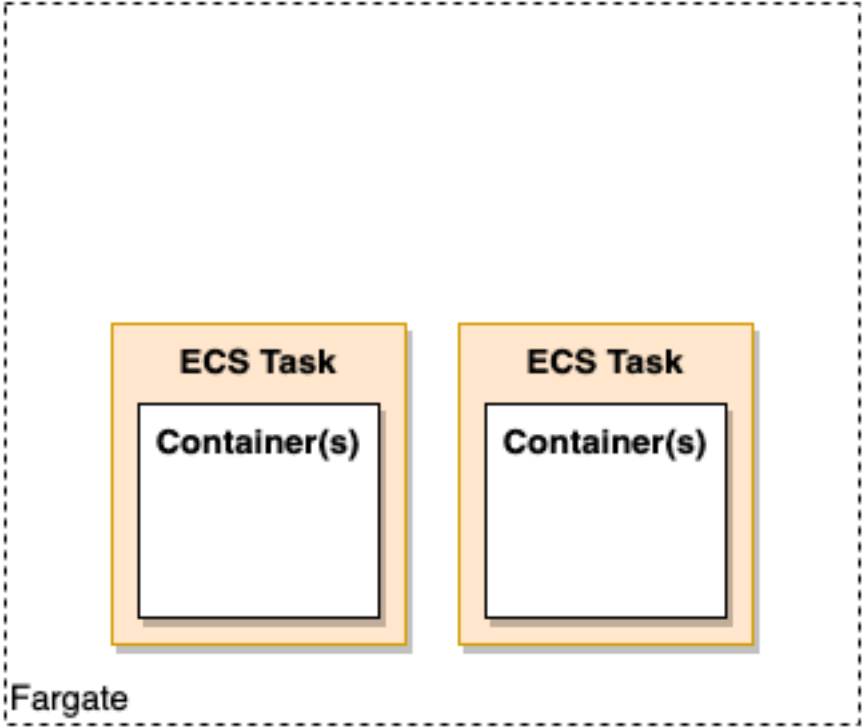


EC2 Launch Type vs. Fargate Launch Type

EC2 LT



Fargate LT



EC2 Instance Mgmt.

EC2 LT

Deploy and manage **your** own
ECS cluster of EC2 instance to
run the tasks.

Fargate LT

Run tasks directly, without
any EC2 instance.

EC2 Instance Mgmt.

EC2 LT

Deploy and manage **your** own
ECS cluster of EC2 instance to
run the tasks.

e.g

- Upgrading ECS Agent/
Upgrading AMI/ Security
patch/ Adding fleet/
Removing fleet

Fargate LT

Run tasks directly, without
any EC2 instance.

Task Definition Parameters

EC2 LT

Support all parameters.

Fargate LT

Not support:

- disableNetworking
- dnsSearchDomains
- dnsServers
- dockerSecurityOptions
- extraHosts
- gpu
- ipcMode
- links
- pidMode
- placementConstraints
- privileged
- systemControls

Task Definition Parameters

EC2 LT

Support all parameters.

Fargate LT

Support with **limitation:**

- linuxParameters (When specifying Linux-specific options that are applied to the container, for capabilities the add parameter is not supported. The devices, sharedMemorySize, and tmpfs parameters are not supported.)
- volumes (Fargate tasks only support bind mount host volumes, so the dockerVolumeConfiguration parameter is not supported.)

Network Mode

EC2 LT

awsvpc

bridge

host

none

Fargate LT

awsvpc

Task CPU and Memory

EC2 LT

As you wish.

Fargate LT

Valid combination table:

CPU value	Memory value
256 (.25 vCPU)	0.5 GB, 1 GB, 2 GB
512 (.5 vCPU)	1 GB, 2 GB, 3 GB, 4 GB
1024 (1 vCPU)	2 GB, 3 GB, 4 GB, 5 GB, 6 GB, 7 GB, 8 GB
2048 (2 vCPU)	Between 4 GB and 16 GB in 1-GB increments
4096 (4 vCPU)	Between 8 GB and 30 GB in 1-GB increments



Amazon Elastic File System (Amazon EFS)

EC2 LT

You can use Amazon EFS file systems with Amazon ECS to access file system data across your fleet of Amazon ECS tasks.

Fargate LT

n/a

Amazon Elastic File System (Amazon EFS)

EC2 LT

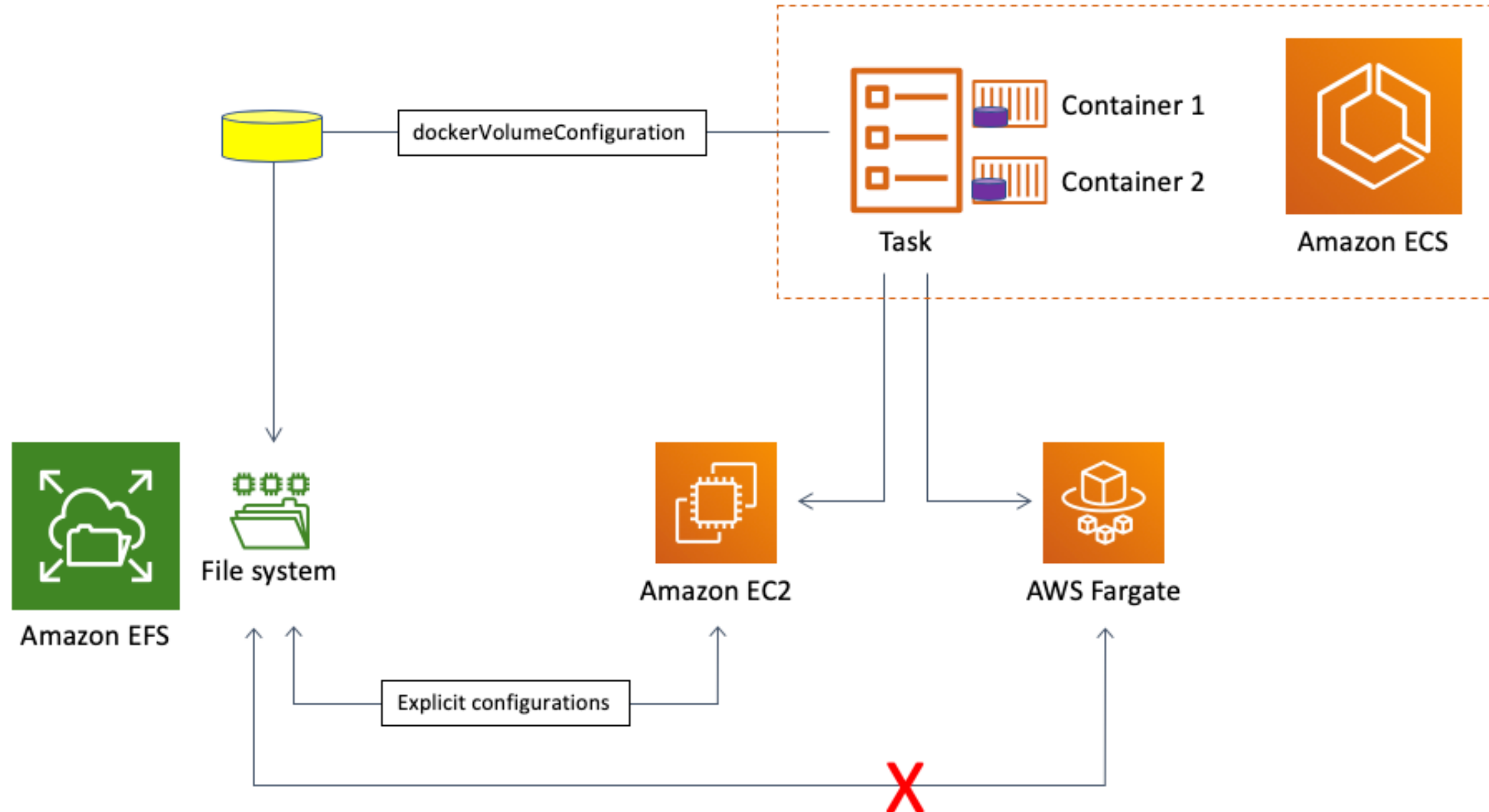
You can use Amazon EFS file systems with Amazon ECS to access file system data across your fleet of Amazon ECS tasks.

Fargate LT

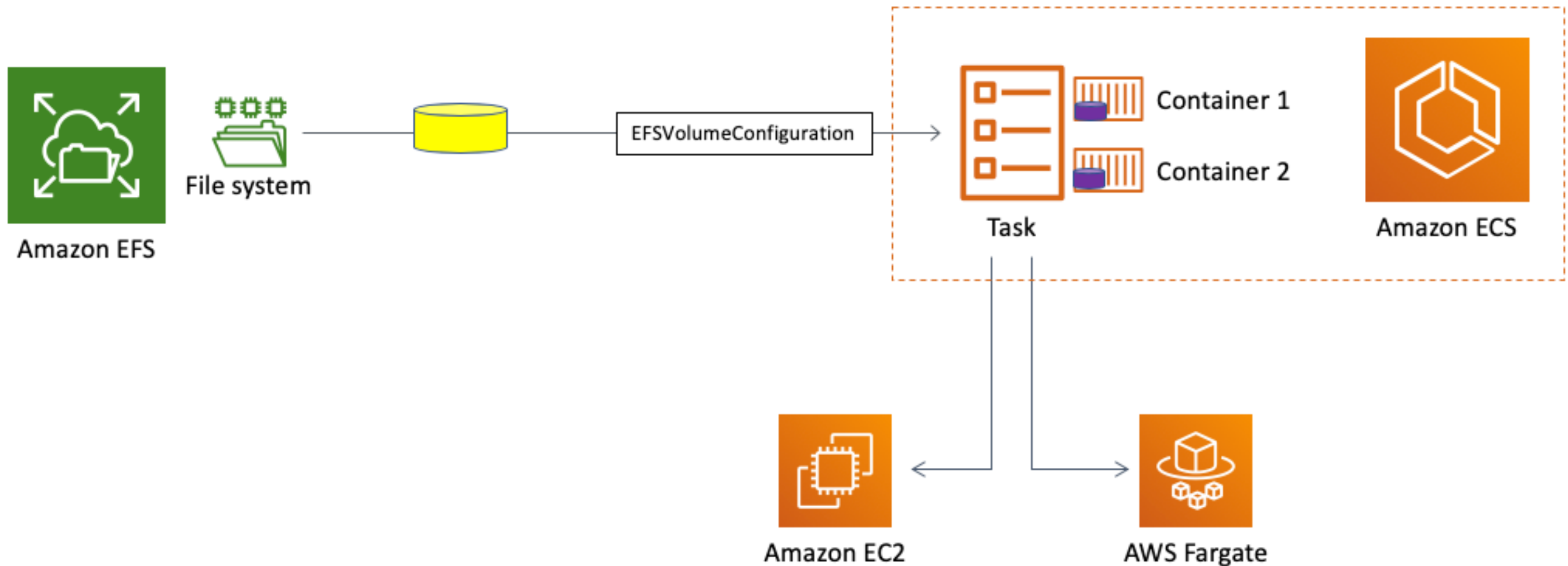
n/a

before version 1.4

Amazon Elastic File System (Amazon EFS)



Amazon Elastic File System (Amazon EFS)



Amazon Elastic File System (Amazon EFS)

EC2 LT

You can use Amazon EFS file systems with Amazon ECS to access file system data across your fleet of Amazon ECS tasks.

Fargate LT

You can use Amazon EFS file systems with Amazon ECS to access file system data across your fleet of Amazon ECS tasks.

Service Load Balancing

EC2 LT

ip

instance

Fargate LT

ip

Task Retirement

EC2 LT

You manage.

Fargate LT

A Fargate task is scheduled to be retired when AWS detects the irreparable failure of the underlying hardware hosting the task or if a security issue needs to be patched.

AWS manages.

Goal (Today's topic)

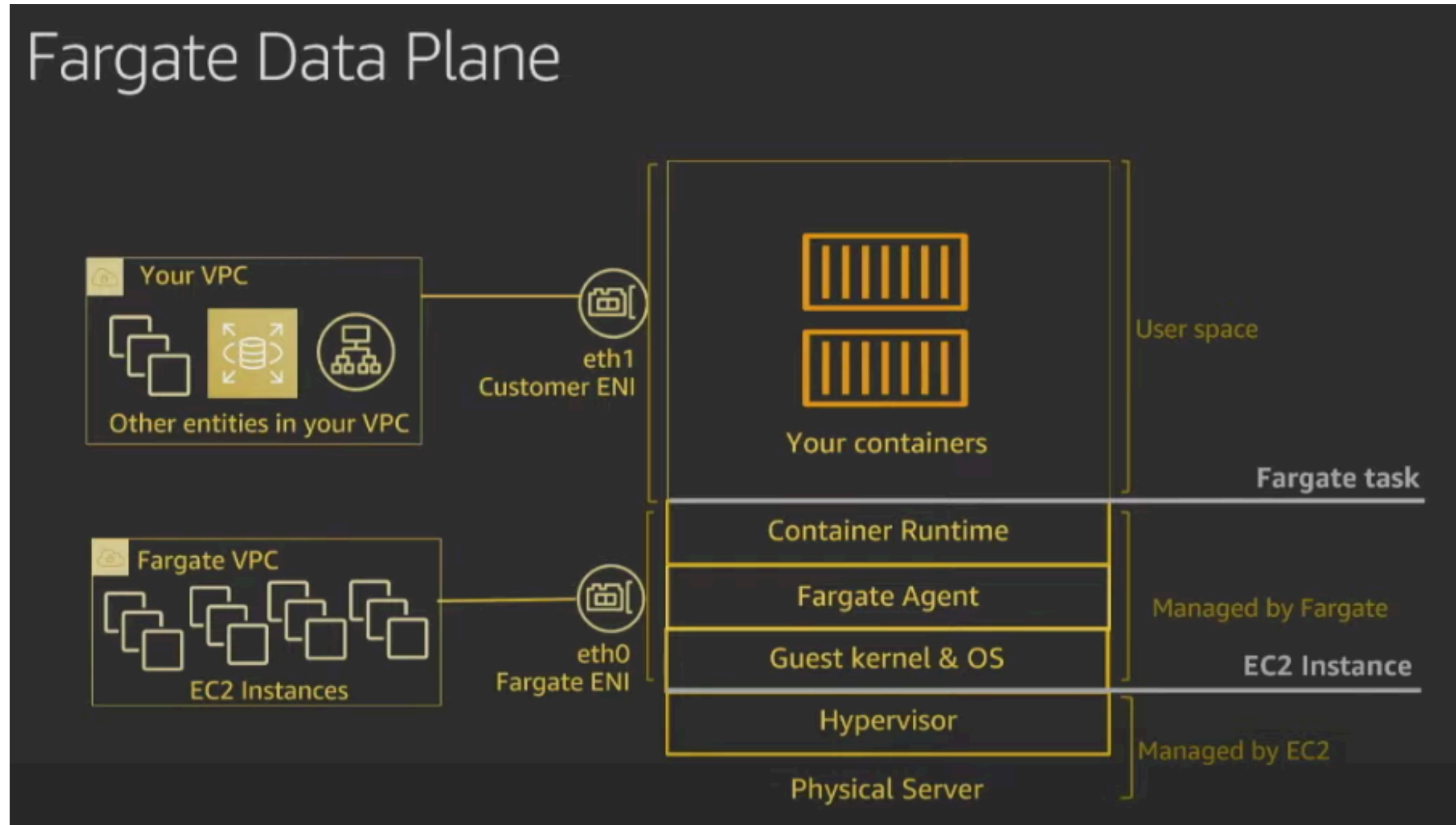
我/我們 選擇一種 Launch Type 跑程式

DEV DAY

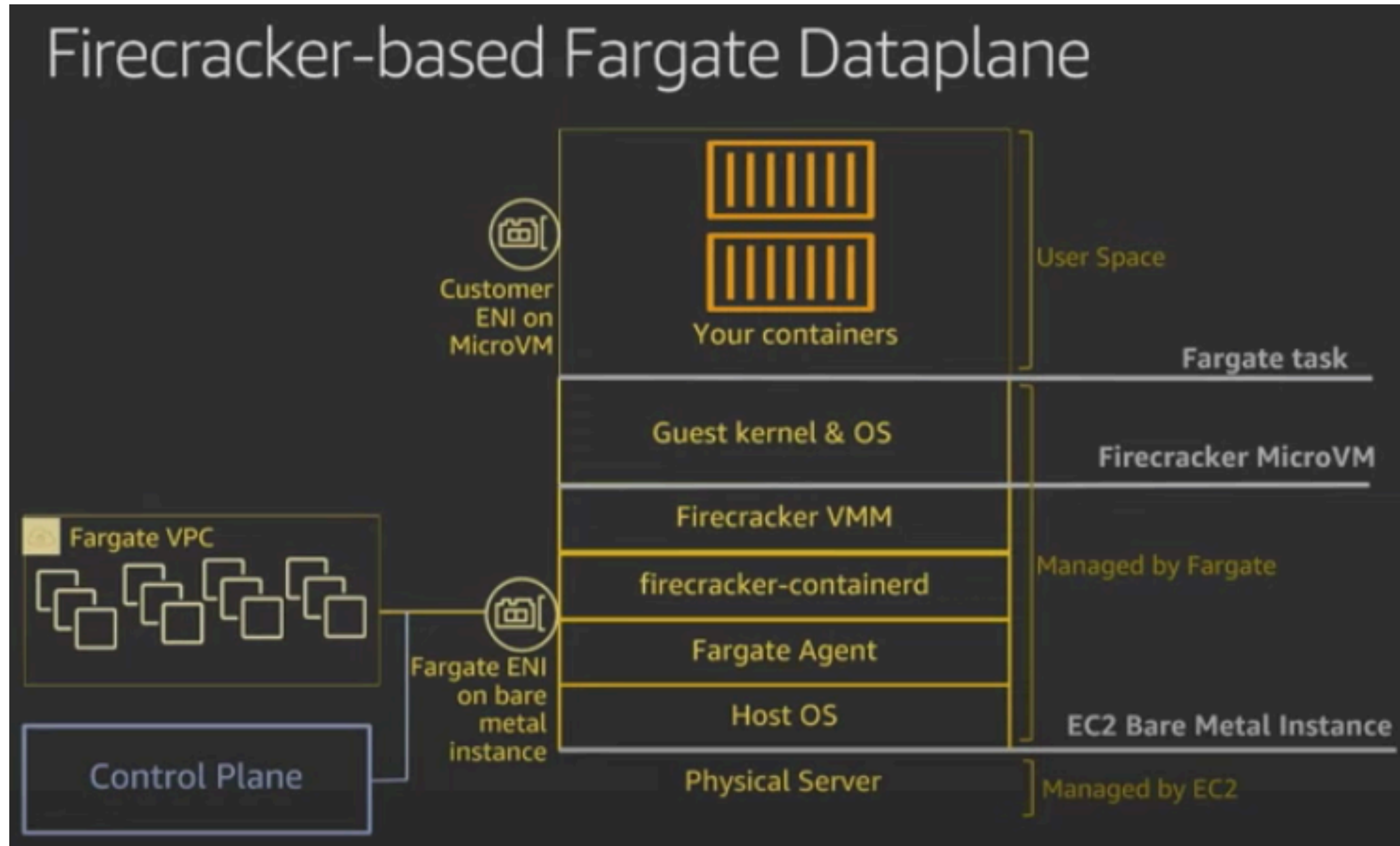
Comparison 而内



AWS Fargate



AWS Fargate with Firecracker



Ref: AWS re:Invent 2019: AWS Fargate under the hood
(CON423-R1)



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Comparison 時間



Comparison

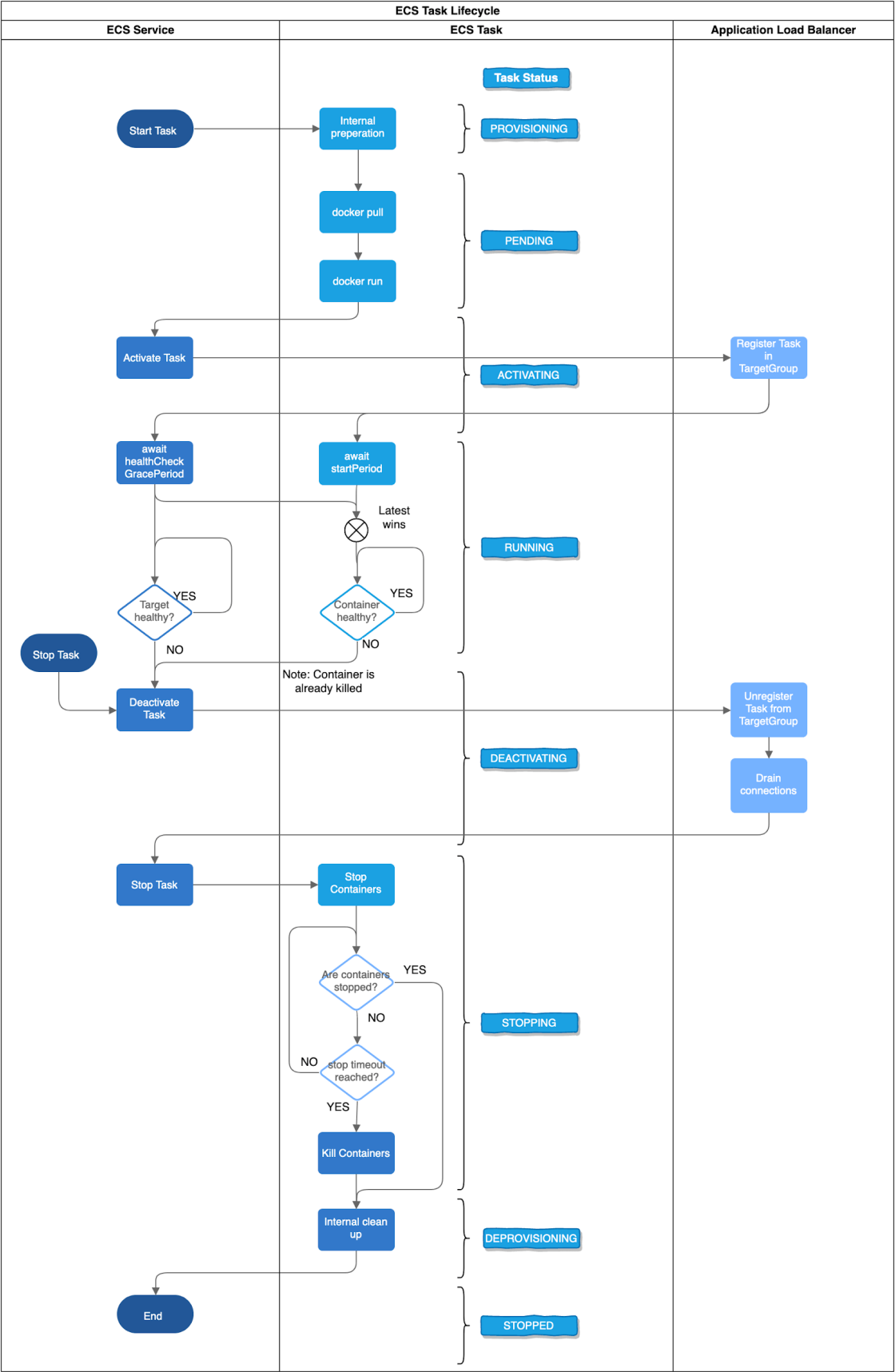
ECS Task Lifecycle

Product Development Lifecycle

ECS Task Lifecycle

by Philipp Garbe (AWS Hero).

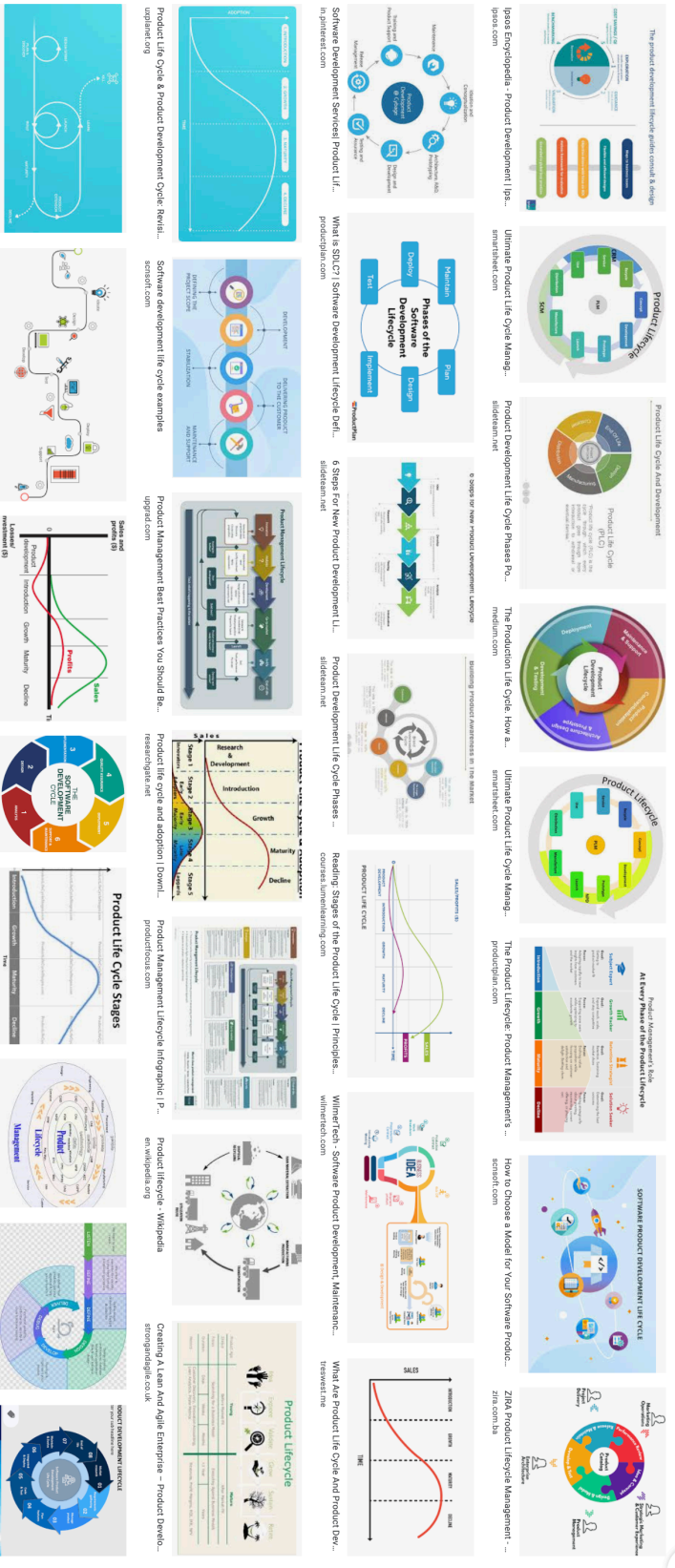
- PROVISIONING
- PENDING
- ACTIVATING
- RUNNING
- DEACTIVATING
- STOPPING
- DEPROVISIONING
- STOPPED



Product Dev Lifecycle

by your team/culture/...

- Plan
- Develop
- Test
- Deploy
- Operate



DEV DAY

Comparison 能力



DEV DAY

Comparison 場景



Scenarios

產品脈絡

- 新產品/既有產品/限制條件

使用情境

- 計畫型/突發型/可預期/不可預期

- 長期運作/短期使用/一次性使用/拋棄式/日拋(咦?)

團隊能力

- 可維運容器/可維運EC2/可維運___/能力分級

時間分配

- 有能力 != 有時間/優先順序/Time-to-market

DEV DAY

Comparison

財務



Financial Comparison Objective

各種視角
細部著手
綜觀全局

Financial Comparison

1-on-1

Capacity

Larger Amount

*1 Ignore ECS Agent memory consumption.

*2 Using EC2 T3 series for general SME use cases.

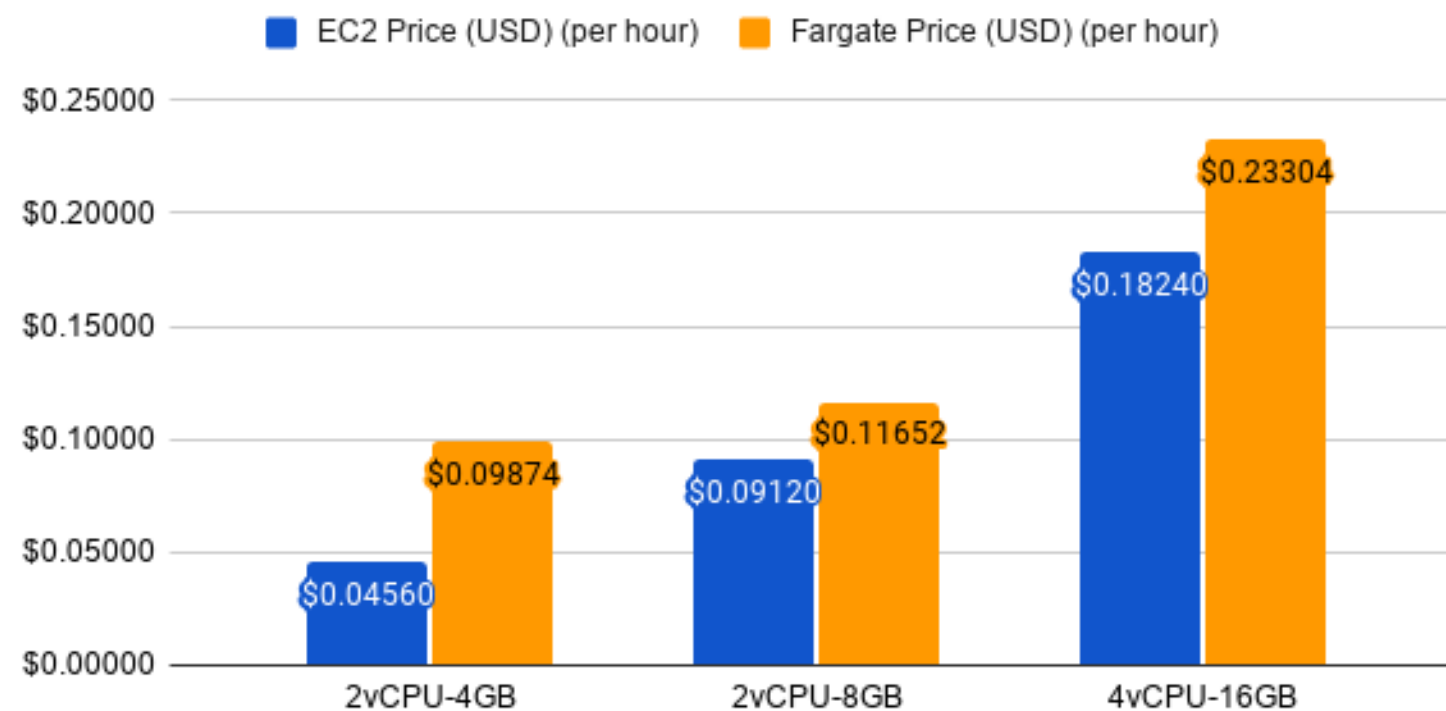
*3 DO NOT use it directly. It's designed for brainstorming.

1-on-1

Name	vCPU	Memory (GB)
Fargate: 2-4GB	2	4
Fargate: 2-8GB	2	8
Fargate: 4-16GB	4	16
EC2: t3.medium	2	4
EC2: t3.large	2	8
EC2: t3.xlarge	4	16

Fargate vs. EC2 1-on-1 Price Comparison

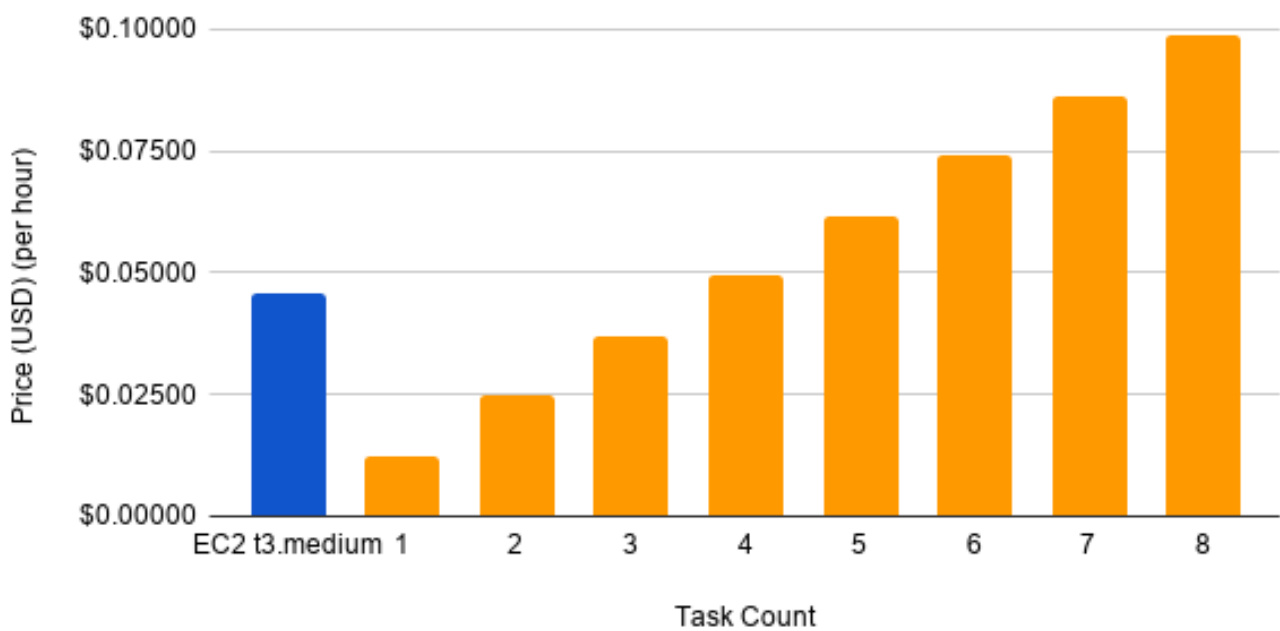
(T3) (eu-west-1) (2020-Nov)



Capacity/Task Count

Amazon ECS Task Count Comparison

(Fargate 0.25vCPU/0.5GB vs. t3.medium 2vCPU/4GB) (eu-west-1) (2020-Nov)



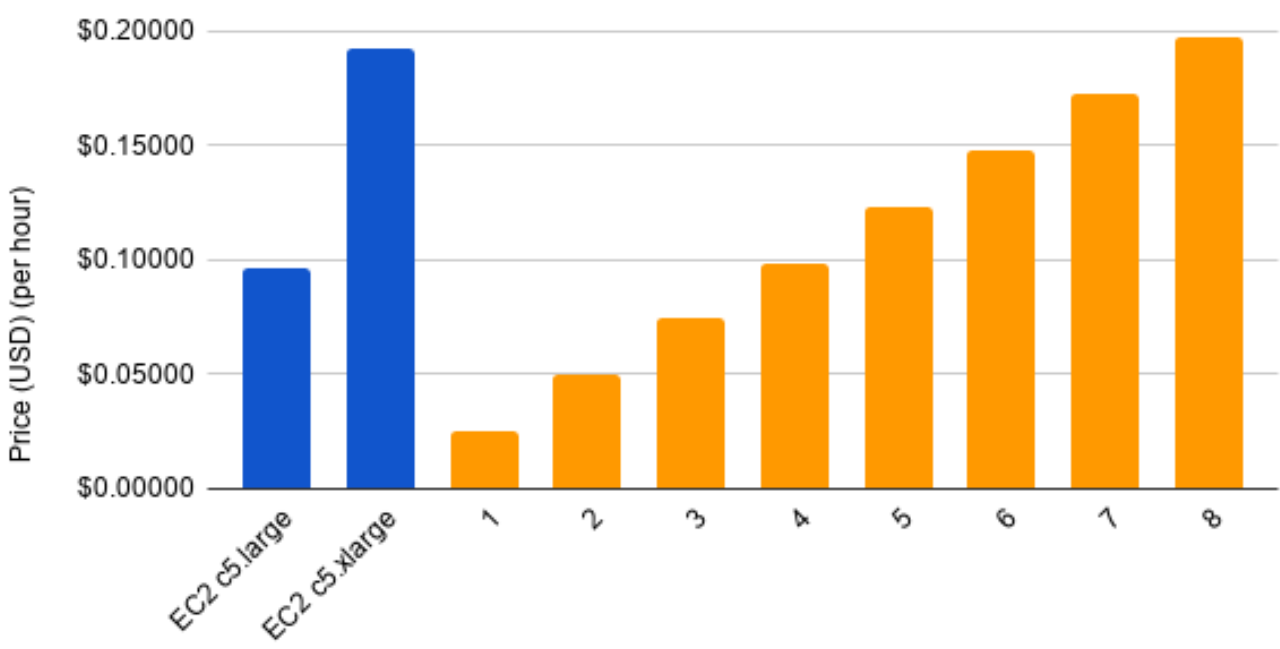
Fargate 0.25 vCPU/0.5GB

VS.

EC2 t3.medium

Amazon ECS Task Count Comparison

(Fargate 0.5vCPU/1GB vs. c5.large 2vCPU/4GB) (eu-west-1) (2020-Nov)



Fargate 0.5 vCPU/1GB

VS.

EC2 c5.large/c5.xlarge

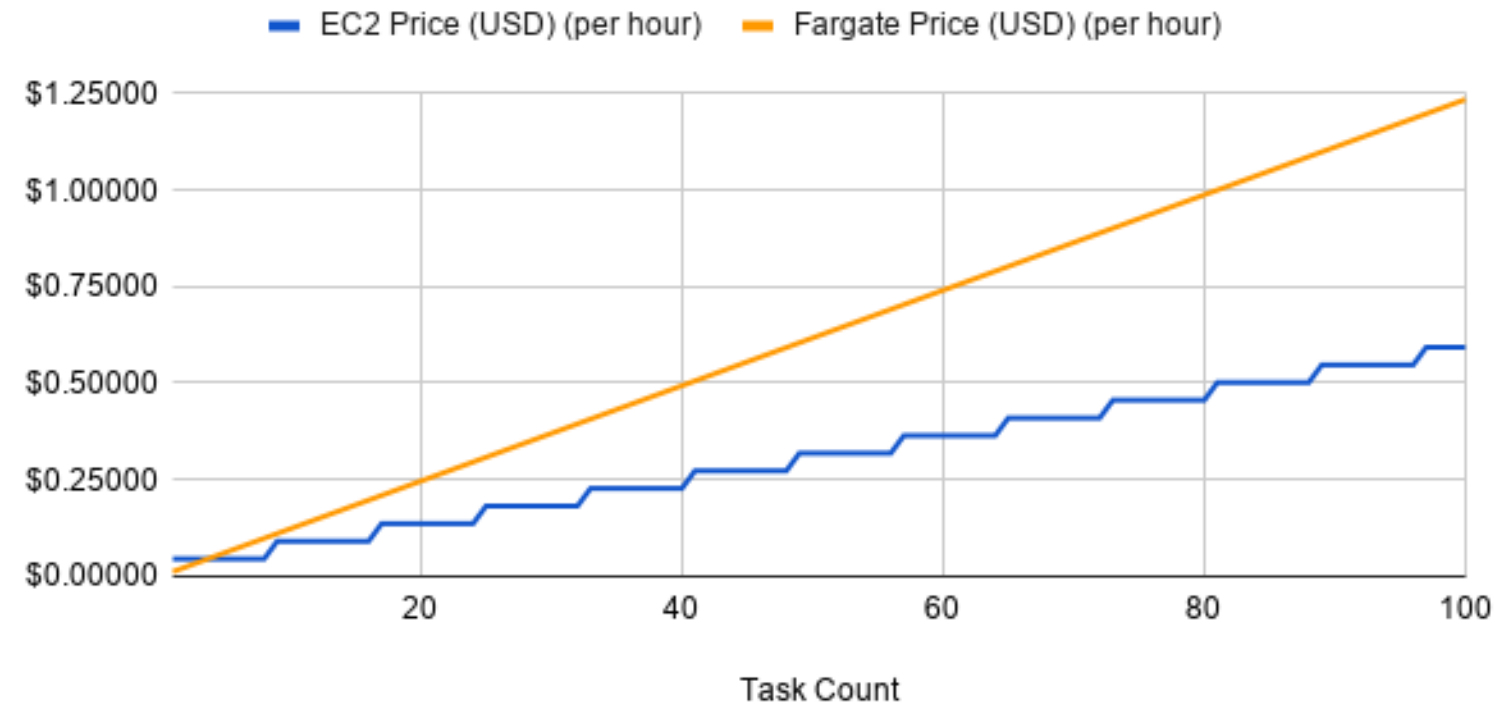


Larger Amount (1~100 Tasks)

How do you think?

Larger Amount Task Count Price Comparison

(Fargate 0.25vCPU/0.5GB vs. t3.medium 2vCPU/4GB) (eu-west-1) (2020-Nov)



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Larger Amount (1~100 Tasks) Adjusted w/ Ops

Assume:

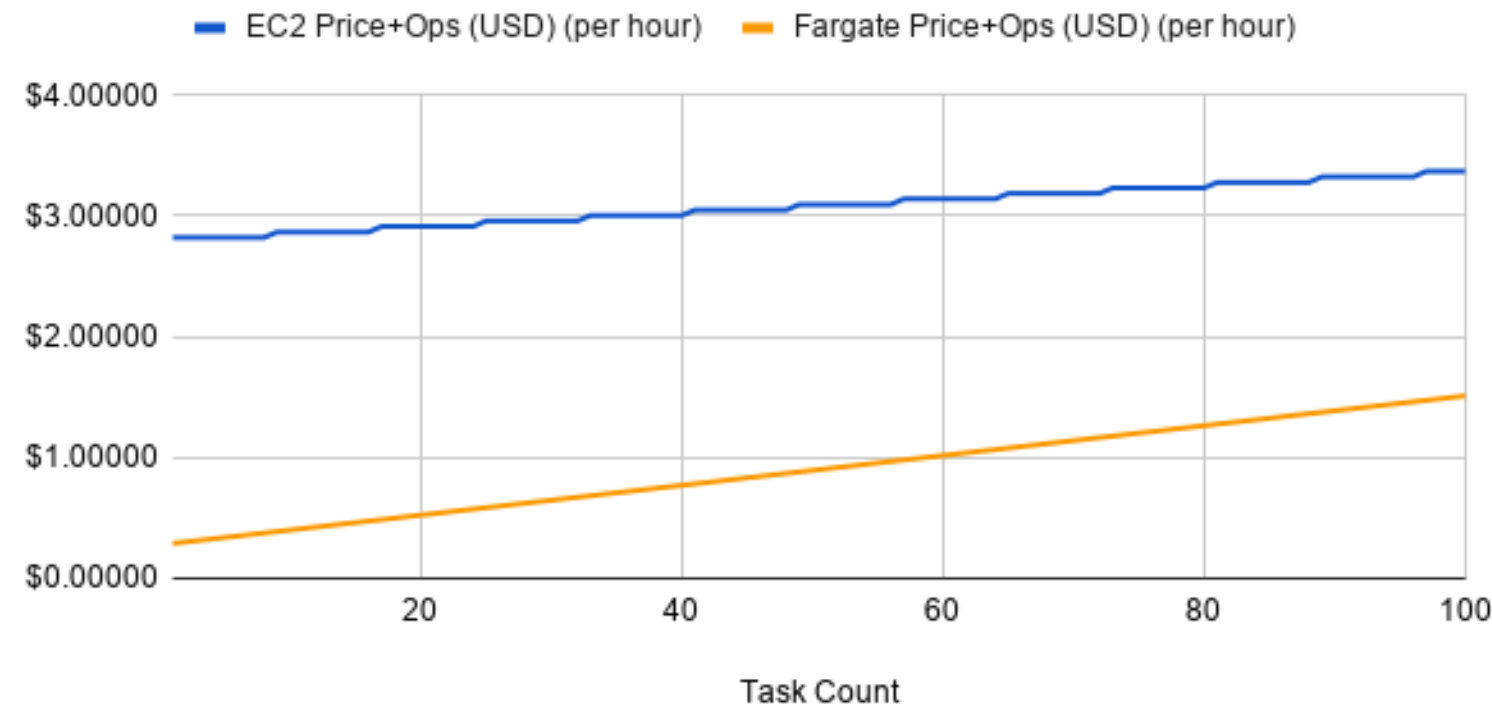
\$2,000 EC2 operation cost
per month (\$2.78/hour)

vs.

\$200 Fargate operation cost
per month (\$0.28/hour)

Larger Amount Task Count Price Comparison Adjusted Ops

(e.g. EC2 Ops \$2.78 vs. Fargate Ops \$0.28) (EXAMPLE!)



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Larger Amount (1~100 Tasks) Adjusted w/ Income

Assume:

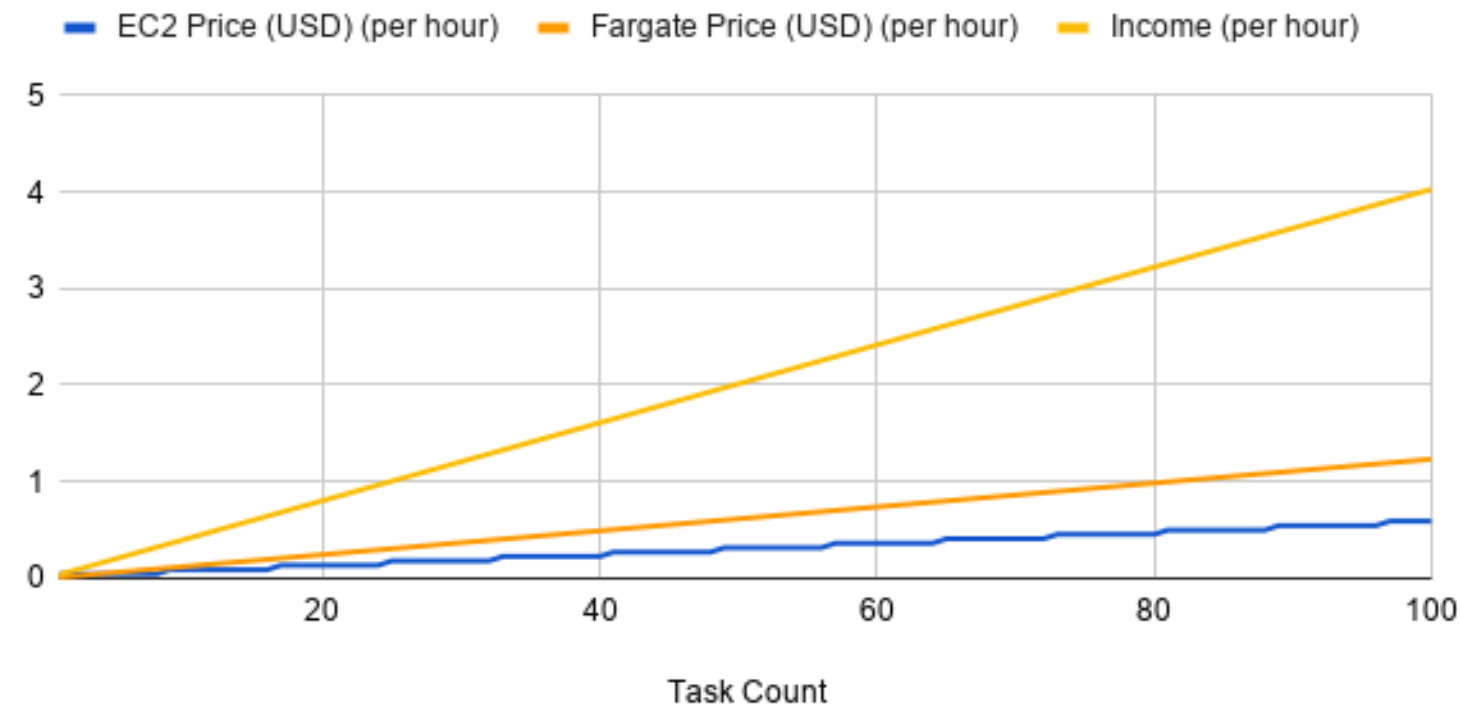
SaaS Model.

\$29/month.

1 task serves 1 customer.

Larger Amount Task Count Price Comparison w/ Income

(e.g. SaaS \$29/month, assumed 1 Task serves 1 customer.)



*1 Ignore ECS Agent memory consumption.

*2 Using EC2 T3 series for general SME use cases.

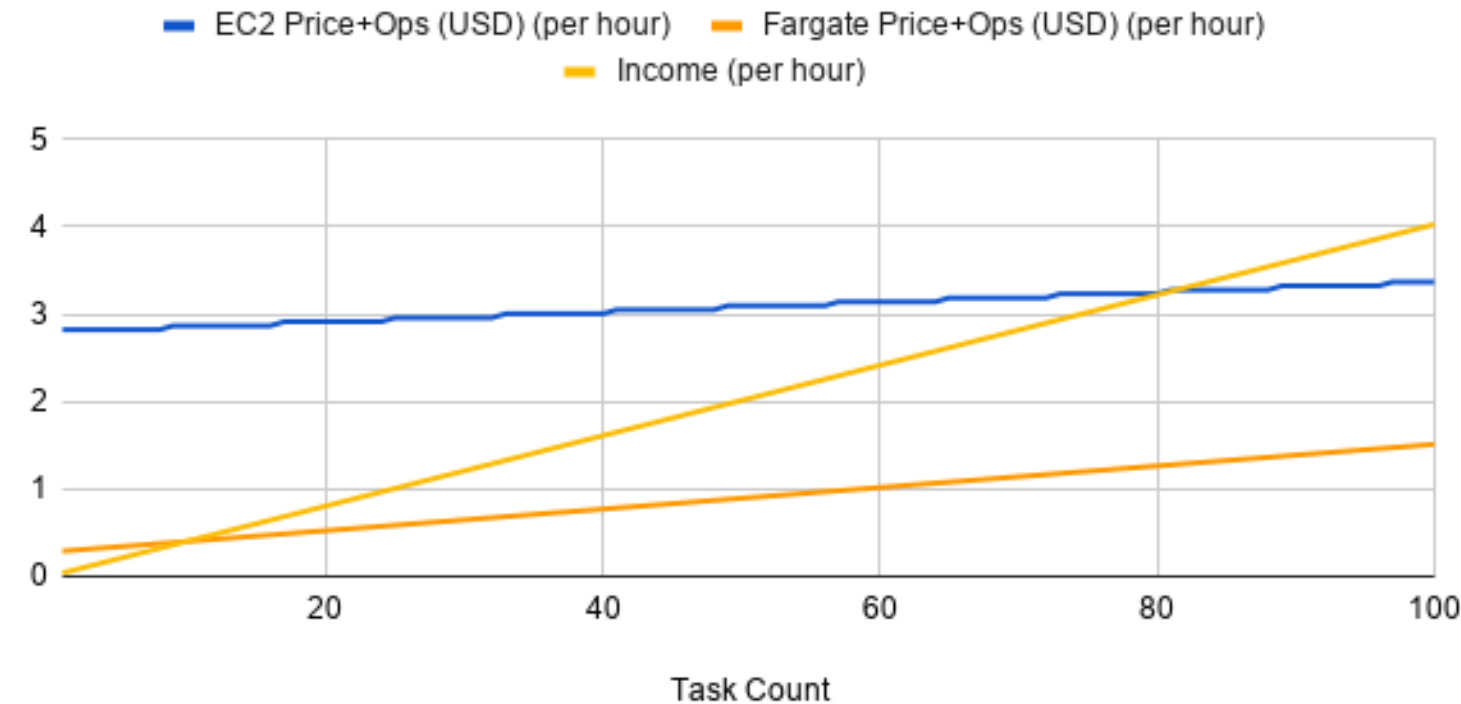
*3 DO NOT use it directly. It's designed for brainstorming.

Larger Amount (1~100 Tasks) Adjusted w/ Income+Ops

Things go with the complexity.

- Diff team, diff ops.
- Diff product, diff income.
- Time-to-market?
- etc...?

Larger Amount Task Count Price Comparison w/ Income+Ops
(e.g. EC2 Ops \$2.78 vs. Fargate Ops \$0.28) (EXAMPLE!)



*1 Ignore ECS Agent memory consumption.

*2 Using EC2 T3 series for general SME use cases.

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Wrap-up



Wrap-up

Technology Selection

-- 燒烤式選型法

Overview Amazon ECS

-- Run Tasks

Amazon ECS Launch Type Comparison

-- EC2 LT vs. Fargate LT

Technology Selection

由外/而內

能力/時間



場景

Technology Selection

沒有最好的技術，但有最適合自己的技術。
沒有最好的行程，但有最適合自己的行程。
沒有最好的美食，但有最適合自己的美食。

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Thank you!

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Director of Product & Technology
Integration at PAFERS Tech
AWS Community Hero

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Please complete the session
survey in the mobile app.

