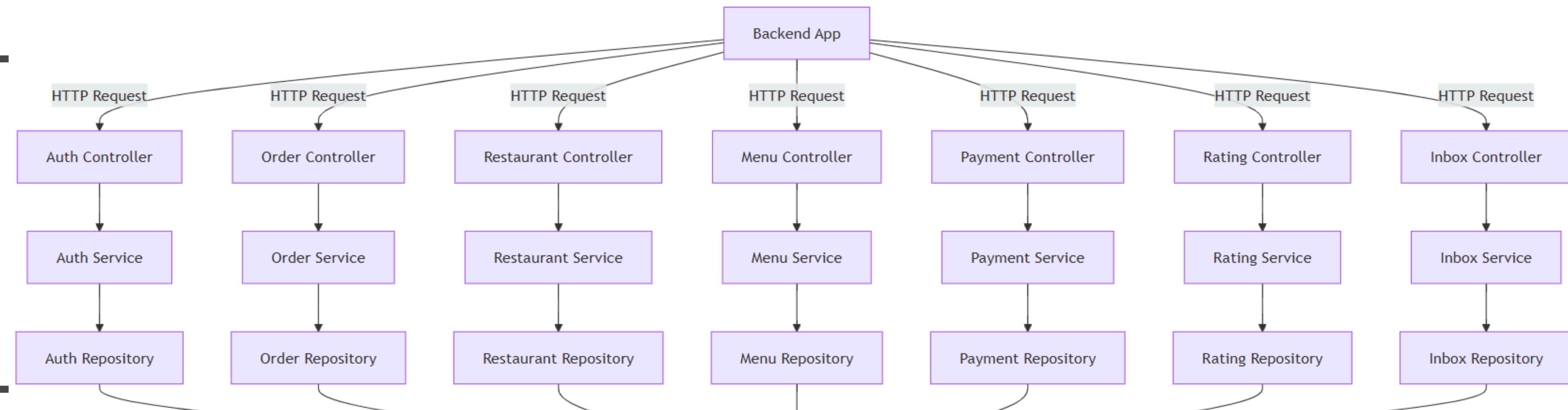


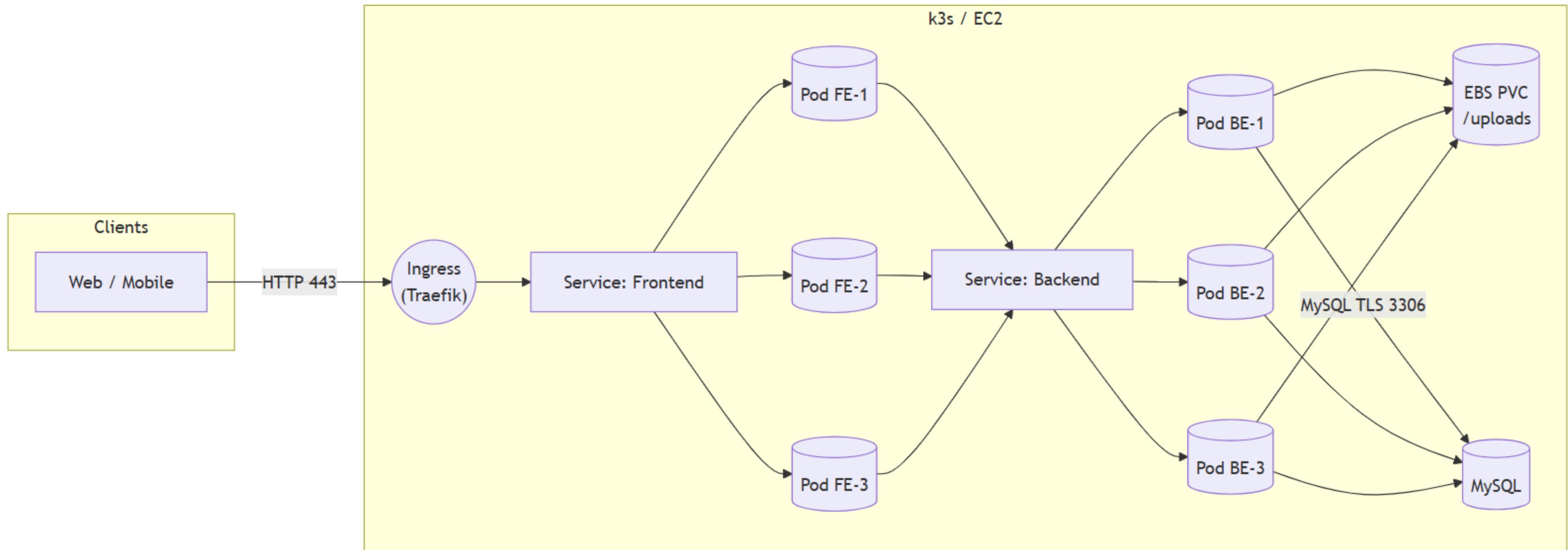
CLOUD NATIVE FINAL MEAL PROVIDER

組員:曾紹幃、李承晏、曾煥宗

後端軟體架構設計



系統架構設計



USER STORY-員工

- 作為員工，我希望能夠瀏覽餐廳提供的菜單並選擇餐點下單，以便方便地訂購每日餐點。
- 作為員工，我希望下單後能確認訂單明細，以便確保我的訂單正確無誤。
- 作為員工，我希望在用餐後可以對餐點給予星級或評論，以便提供回饋讓其他同事和餐廳了解菜色品質。
- 作為員工，我希望查看過去的點餐記錄與消費明細，以便追蹤自己的用餐情況或費用報銷。

USER STORY-管理員

- 作為餐廳管理員，我希望能夠新增、修改或下架菜單項目，以便定期調整菜單內容。
- 作為餐廳管理員，我希望每個月可以查看員工的點餐統計報表，以便分析營運狀況並作出採購和行銷決策。
- 作為餐廳管理員，我希望查看所有訂單與評價記錄，以便即時了解服務品質並改善菜色或服務。

USER STORY-店員

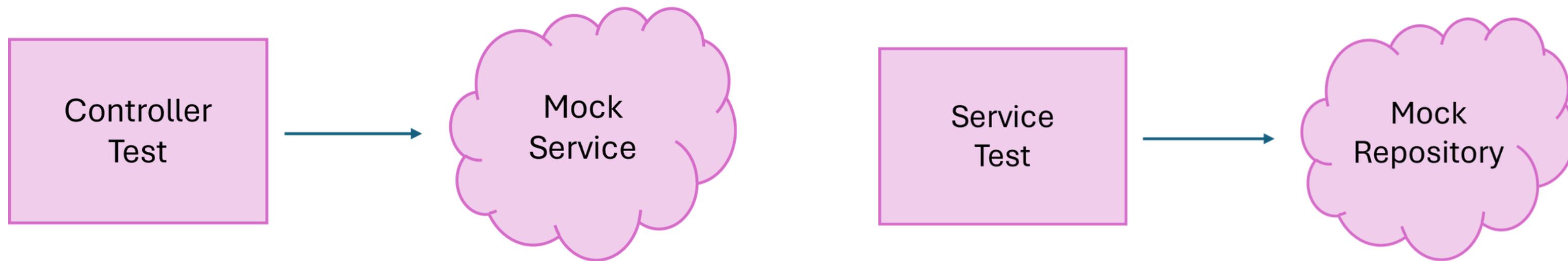
- 作為店員，我希望能夠查看所有已下單的訂單列表（包含員工姓名、餐點內容與下單時間），以便掌握當前需處理的訂單。
- 作為店員，我希望能將每筆訂單的狀態從「待處理」更新為「製作中」、「已完成」、「已取餐」等狀態，以便讓員工與管理員即時掌握餐點進度。
- 作為店員，我希望能依據訂單的狀態或時間排序訂單列表，以便優先處理即將到餐時間的訂單。

TEST

- Backend Unit Test
- load testing: k6

BACKEND UNIT TESTS

- Jest
- 分別測試每一個 Service 與 Controller



LOAD TEST-K6

```
(base) PS C:\Users\willi\Desktop\Codes\Project\Cloud Native\Cloud-Native-final>
• >> k6 run loadtest.js

Grafana
  execution: local
  script: loadtest.js
  output: -
```

scenarios: (100.00%) 1 scenario, 300 max VUs, 4m20s max duration (incl. graceful stop):
 * default: Up to 300 looping VUs for 3m50s over 4 stages (gracefulRampDown: 30s, gracefulStop: 30s)

THRESHOLDS

```
http_req_duration
✓ 'p(95)<1000' p(95)=247.12ms

http_req_failed
✓ 'rate<0.01' rate=0.00%
```

TOTAL RESULTS

```
HTTP
http_req_duration.....: avg=230.85ms min=207.81ms med=229.48ms max=899.06ms p(90)=240.74ms p(95)=247.12ms
{ expected_response:true }.....: avg=230.85ms min=207.81ms med=229.48ms max=899.06ms p(90)=240.74ms p(95)=247.12ms
http_req_failed.....: 0.00% 0 out of 112491
http_reqs.....: 112491 488.1148/s

EXECUTION
iteration_duration.....: avg=894.98ms min=828.74ms med=891.53ms max=1.79s p(90)=926.48ms p(95)=948.01ms
iterations.....: 37497 162.704933/s
vus.....: 5 min=3
max=299
vus_max.....: 300 min=300 max=300

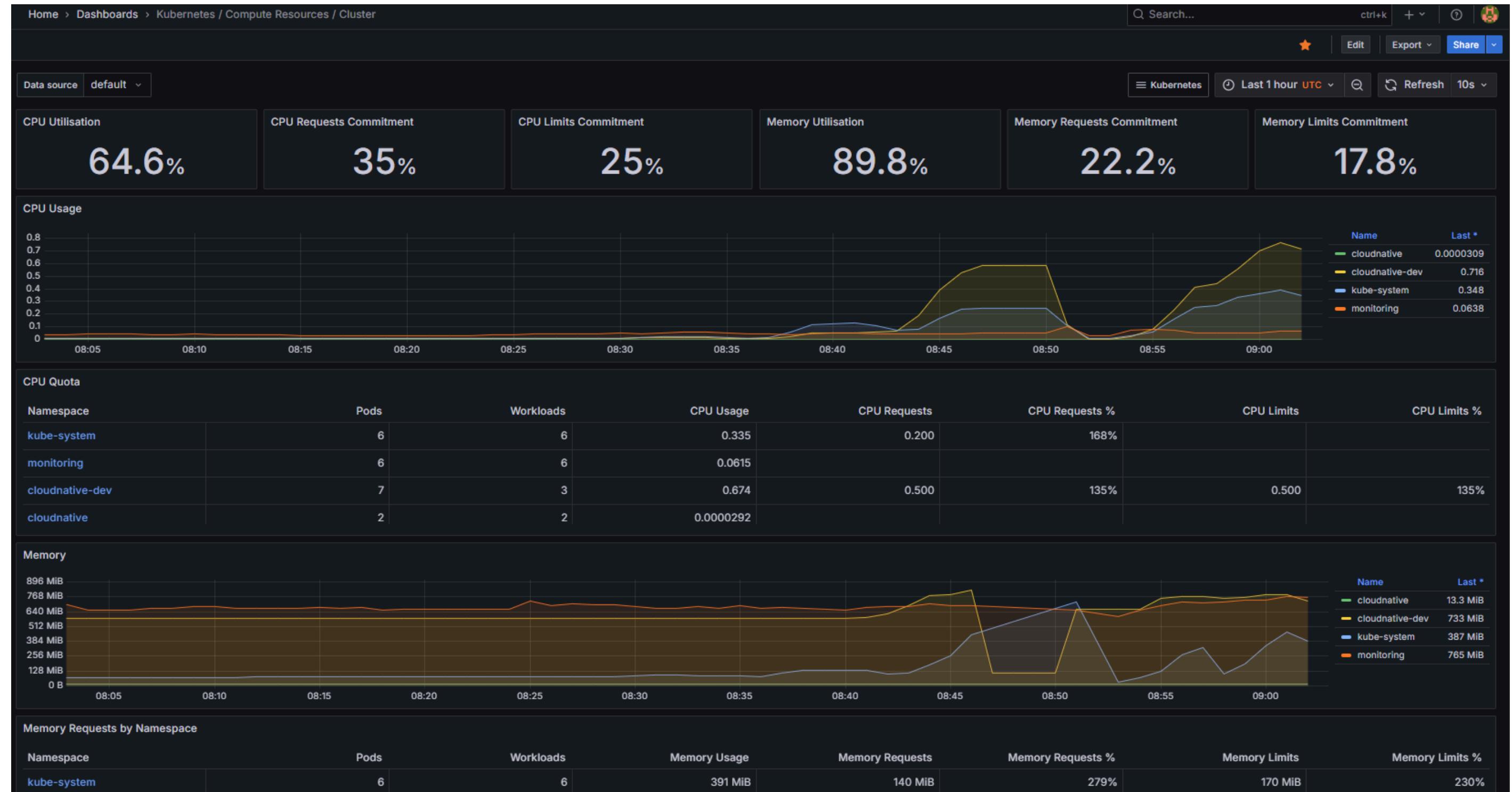
NETWORK
data_received.....: 52 MB 226 kB/s
data_sent.....: 9.8 MB 43 kB/s
```

running (3m50.5s), 000/300 VUs, 37497 complete and 0 interrupted iterations
default ✓ [=====] 000/300 VUs 3m50s

Success on

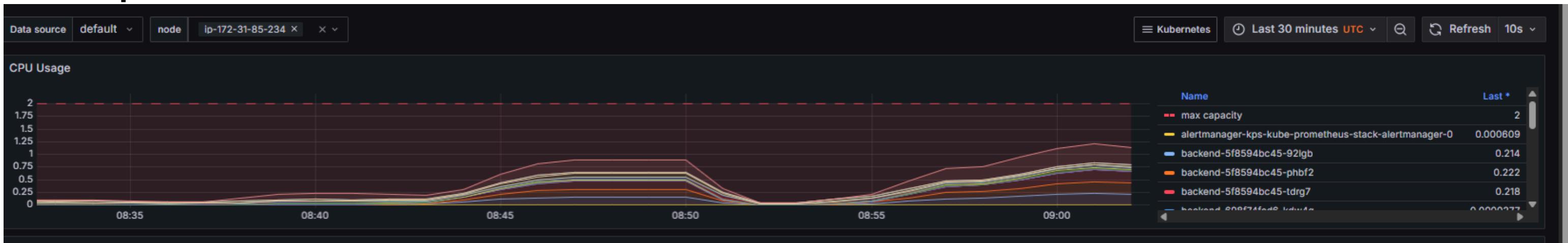
```
export const options = {
  stages: [
    { duration: '20s', target: 50 }, // 快速加壓，初始探測
    { duration: '1m', target: 100 }, // 中壓穩定期
    { duration: '2m', target: 300 }, // 高壓期：模擬尖峰
    { duration: '30s', target: 0 }, // 降壓
  ],
  thresholds: {
    http_req_failed: ['rate<0.01'],
    http_req_duration: ['p(95)<1000'],
  },
};// 每個使用者每 200ms 打完一輪請求
sleep(0.2);
```

MONITOR-CLUSTER

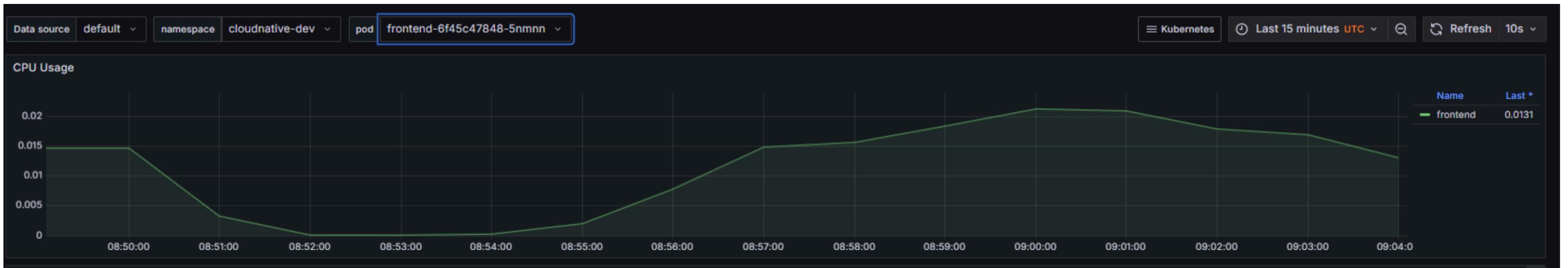


MONITOR-POD

All pods



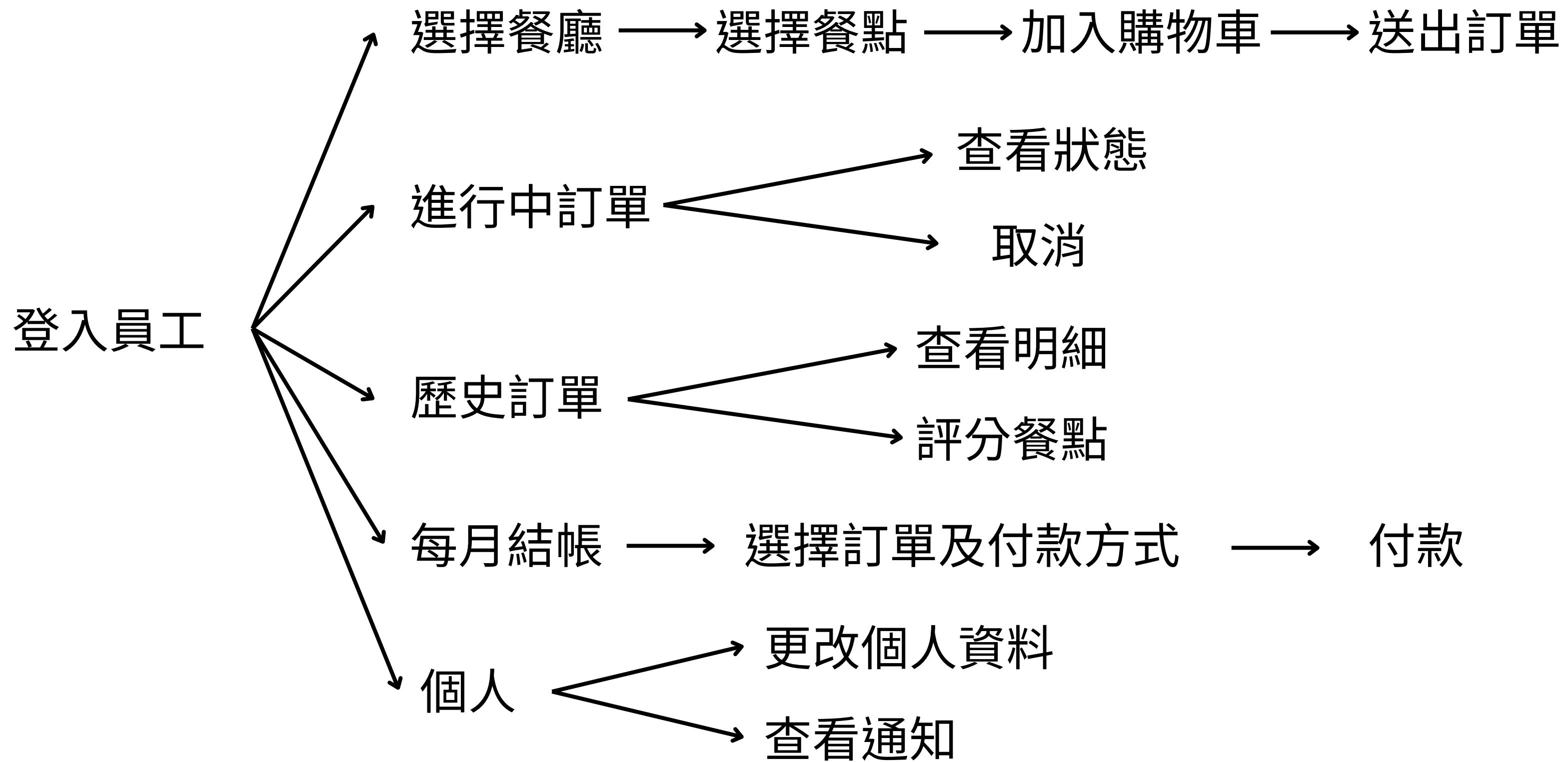
Single pod



CICD Workflow

- 使用 GitHub Actions 建立 CI/CD 流程
- CI 執行 backend unit test
- docker build Frontend / Backend image
- SSH 遠端登入 EC2，部署至 K3s 叢集
- 自動等待 MySQL 就緒，確保後端啟動成功
- 支援多環境部署 (main 分支為正式環境，develop 為 dev)

前端流程



訂餐流程

The diagram illustrates a sequential workflow for placing a food order:

- Step 1: Restaurant Selection**
The user is on the "Restaurant Order System" homepage. They select "Restaurants" from the sidebar. The page shows three partner restaurants: Pizza Palace (4.5 stars), Burger Barn (4.2 stars), and Sushi Zen (4.8 stars). Each listing includes a thumbnail image, name, rating, description, delivery time (15-30 min), and pickup availability.
- Step 2: Pizza Selection**
The user selects "Burger Barn" and navigates to its menu. They choose the "Italian" category and select the "Margherita Pizza" (\$18.99) and "Pepperoni Pizza" (\$21.99). Each pizza listing includes a thumbnail, name, price, description, and a "View Details" button.
- Step 3: Customization**
The user adds the Margherita Pizza to their cart. A modal overlay appears, allowing them to choose toppings: "Mixed Cheese" or "Vegan Cheese". They also select "Pickup" as the order type. The "Add to Cart" button is highlighted in orange.
- Step 4: Confirmation**
The user is taken to the "Order #26564051" confirmation page. The order details are listed:
 - Ordered: 2025/6/4 下午4:42:44
 - Delivery Time: 15-30 minutes
 - Payment: PendingThe "Order Items" section details the Margherita Pizza (\$18.99) and Crispy Fries (\$6.99). The "Order Summary" shows a subtotal of \$31.98, tax of \$2.56, and a total of \$34.54.
- Step 5: Shopping Cart**
The user is directed to the "Shopping Cart" page, which lists the items they have added:
 - Crispy Fries (\$6.99)
 - Salmon Sashimi (\$24.99)A "Checkout" button is prominently displayed.

進行中訂單

Restaurant Order System

Ongoing Orders

Track your current orders

Order #1 Preparing
Pizza Palace • 2025/6/4 • pickup
Items: 2x Margherita Pizza

Total: \$37.98

Note: Please ring doorbell

Order #2 Pending
Burger Barn • 2025/6/3 • pickup
Items: 1x Classic Cheeseburger, 1x Crispy Fries

Total: \$21.98

Order #3 Confirmed
Sushi Zen • 2025/6/3 • dine-in
Items: 1x Salmon Sashimi

Total: \$24.99

Note: Call when arrived

Order #4 Ready
Pizza Palace • 2025/6/3 • pickup
Items: 1x Pepperoni Pizza

Order System John Employee

Restaurants

Ongoing Orders

Order History

Payment

Personal

Quick Actions

View Cart

Restaurant Order System

Order #1

Your order is being prepared.

Ordered: 2025/6/4 上午2:30:00 Pickup: Payment: Paid

Order Items

Margherita Pizza x2 \$37.98
\$18.99 each

Note: Extra basil please

Restaurant

Pizza Palace

Contact restaurant for updates

Order Summary

Subtotal	\$37.98
Tax (8%)	\$3.04
Total	\$41.02

Special Instructions

Please ring doorbell

Order System John Employee

Restaurants

Ongoing Orders

Order History

Payment

Personal

Quick Actions

View Cart

歷史訂單

The diagram illustrates a user flow through a restaurant ordering system interface. It starts with a 'History' page on the left, which lists six orders. From each order card, a blue arrow points to a detailed view of that specific order. A large grey arrow at the bottom points from the detailed view back to a 'Rate Your Experience' page on the right.

Left Panel: History Page

- Order System**: John Employee
- Restaurants**
- Ongoing Orders** (selected)
- Order History**
- Payment**
- Personal**

Quick Actions: View Cart

Restaurant Order System

- Total: \$21.98**
- Order #3**: Confirmed, Paid
Sushi Zen • 2025/6/3 • dine-in
Items: 1x Salmon Sashimi
- Total: \$24.99**
- Note:** Call when arrived
- Order #4**: Ready, Paid
Pizza Palace • 2025/6/3 • pickup
Items: 1x Pepperoni Pizza
- Total: \$21.99**
- Order #5**: Completed, Paid
Burger Barn • 2025/6/2 • pickup
Items: 1x Veggie Burger
- Total: \$13.99**
- Note:** Leave at door
- Order #6**: Cancelled
Sushi Zen • 2025/5/31 • pickup
Items: 2x California Roll
- Total: \$25.98**

Middle Panel: Order Detail View

- Restaurants**
- Ongoing Orders** (selected)
- Order History**
- Payment**
- Personal**

Quick Actions: View Cart

Order #3: Confirmed

Your order has been confirmed and will be prepared soon.

Ordered: 2025/6/3 下午4:00:00 | Dine In | Payment: Paid

Order Items

Item	Quantity	Price
Salmon Sashimi	x1	\$24.99
Note: Fresh wasabi on the side		

Restaurant: Sushi Zen
Contact restaurant for updates

Order Summary

Subtotal	\$24.99
Tax (8%)	\$2.00
Total	\$26.99

Special Instructions: Call when arrived

Right Panel: Rating Page

- Restaurants**
- Ongoing Orders**
- Order History**
- Payment**
- Personal**

Quick Actions: View Cart

Order System: John Employee

Rate Your Experience

How was your order from Burger Barn?

Order #5

Date: 2025/6/2
Items: 1x Veggie Burger
Total: \$13.99

How was the taste?

How was the value for money?

Additional Comments (Optional)

taste like 🍔

13/500 characters

Cancel | Submit Rating

付款

Payment Center

Manage your unpaid orders and process payments

Total Unpaid **\$53.96**

Unpaid Orders **2**

Selected Total **\$53.96**

Unpaid Orders Deselect All

Order #1749026564051 <input checked="" type="checkbox"/> Burger Barn ⌚ 2025/6/4 pending	\$31.98 Unpaid
1x Crispy Fries, 1x Salmon Sashimi	
Order #2 <input checked="" type="checkbox"/> Burger Barn ⌚ 2025/6/3 pending	\$21.98 Unpaid
1x Classic Cheeseburger, 1x Crispy Fries	

Payment Details

Selected Orders

Order #1749026564051	\$31.98
Order #2	\$21.98
Total	\$53.96

Payment Method

Credit/Debit Card

Bank Transfer

Cash Payment

Card Number
1234 5678 9012 3456

Expiry MM/YY **CVV** 123

Cardholder Name
John Doe

Pay \$53.96

個人

Profile Active



John Employee

Employee

Member since 2024/1/1

Full Name: John Employee

Email Address: employee@test.com

Phone Number: +1234567890

Edit Profile

Total Orders: 7 All time

Completed: 1 Successfully delivered

Total Spent: \$178.89 Lifetime value

Favorite Orders: 3 Most frequent

Favorite Restaurant

Burger Barn

3 orders placed • You're a loyal customer!

Preferred Customer Special discounts available

43% of your orders

Messages

Inbox View your messages and notifications

Inbox 4 unread

Refresh ✓ Mark all read

Monthly Payment Reminder

Dear team member, This is a friendly reminder that your monthly payment is due at the end of this month. Please ensure you have completed all necessary payment procedures. If you have any questions or concerns, please don't hesitate to reach out to the admin team. Thank you for your attention to this matter. Best regards, Admin Team

1m ago

Order Confirmed

Your order #12345 has been confirmed and is being prepared. Estimated delivery time: 30-45 minutes.

15m ago

Delivery Update

Your order #12344 is out for delivery! Your driver will arrive in approximately 10 minutes.

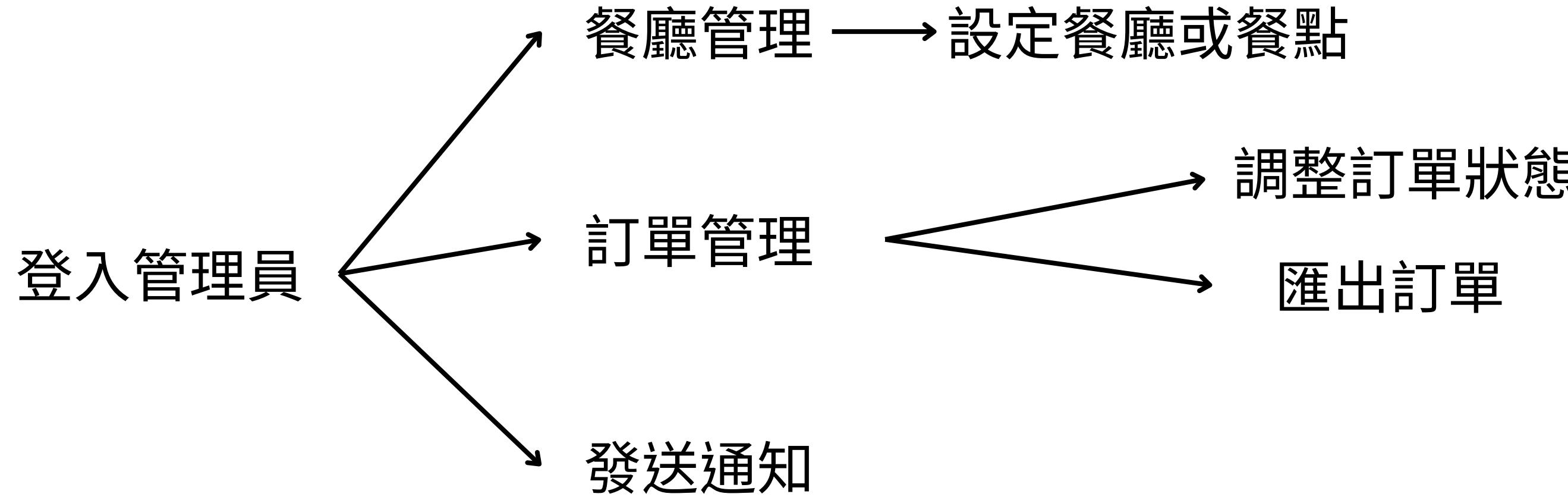
45m ago

Order Delivered

Your order #12343 has been successfully delivered. Thank you for choosing our service! Please rate your experience.

2h ago

前端流程



餐廳管理

The diagram illustrates a user interface flow for managing restaurants. It starts with a 'Restaurant Management' dashboard showing three listed restaurants: Pizza Palace, Burger Barn, and Sushi Zen. An arrow points from this dashboard to a detailed 'Update Restaurant' form for Sushi Zen.

Restaurant Order System

Restaurant Management
Manage your restaurant listings and settings

+ Add Restaurant

Search restaurants... All Status

Showing 3 of 3 restaurants

- Pizza Palace** ★ 4.5
Authentic Italian pizzas made with fresh ingredients
Active 15-30 min
ID: 1 Manage Menu
- Burger Barn** ★ 4.2
Gourmet burgers and crispy fries
Active 15-30 min
ID: 2 Manage Menu
- Sushi Zen** ★ 4.8
Fresh sushi and Japanese cuisine
Active 15-30 min
ID: 3 Manage Menu

Admin Panel
Jane Admin

- Dashboard
- Restaurant Management**
- Order Management
- Send Notification

Restaurant Order System

Restaurant Management
Manage your restaurant settings

Cuisine Type * Italian

Restaurant Image URL https://images.unsplash.com/photo-1604382355076-af4b0eb60143?w=

Contact Information

Address 123 Main St, Downtown

Phone Number +1-555-0101 Email Address info@pizzapalace.com

Operational Settings

Delivery Time 25-35 min

Restaurant is active and accepting orders

Cancel Update Restaurant

Sushi Zen ★ 4.8
Fresh sushi and Japanese cuisine
Active 15-30 min
ID: 3 Manage Menu

訂單管理

Restaurant Order System

Jane Admin 2

Order Management

Monitor and manage all customer orders

Search by order ID or restaurant... All Status All Time

Showing 6 of 6 orders

ORDER ID	RESTAURANT	CUSTOMER	DATE	TOTAL	STATUS	ACTIONS
#1	Pizza Palace	1	2025/6/4	\$37.98	preparing	View Preparing
#2	Burger Barn	2	2025/6/3	\$21.98	pending	View Pending
#3	Sushi Zen	3	2025/6/3	\$24.99	confirmed	View Confirmed
#4	Pizza Palace	1	2025/6/3	\$21.99	ready	View Ready
#5	Burger Barn	2	2025/6/2	\$13.99	completed	View
#6	Sushi Zen	3	2025/5/31	\$25.98	cancelled	View

發送通知

Restaurant Order System

Jane Admin [
2]

Quick Actions

[Payment Reminder Template](#)

Send To

All Employees (4)

Specific Employee

Message Type

Information
General information or announcements

Success
Positive updates or confirmations

Warning
Important notices that need attention

Error
Critical issues or problems

Title

Enter notification title...

0/100 characters

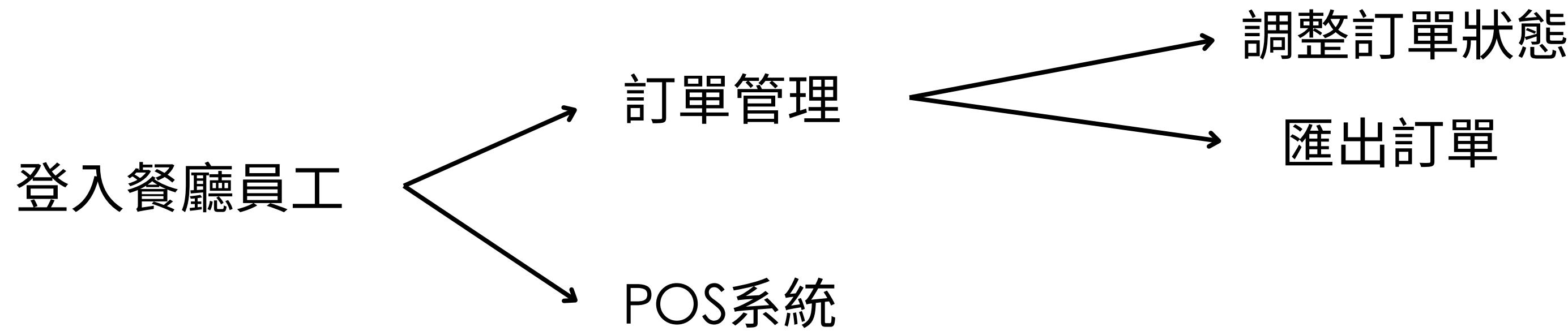
Preview

Enter title and message to see preview

Recipients

All employees (4)

餐廳員工流程



POS系統

Point of Sale

Select Restaurant

Pizza Palace

Search menu items...

All Categories

 Margherita Pizza
Classic pizza with fresh mozzarella, basil, and...
\$18.99 +

 Pepperoni Pizza
Traditional pepperoni pizza with mozzarella...
\$21.99 +

Current Order [Clear All](#)

Customer Information

Customer Name

Phone Number

Margherita Pizza
\$18.99 each

- 1 + 

Subtotal \$18.99

Tax (8%) \$1.52

Total **\$20.51** 

 **Cash Payment**

LINK

<http://13.218.27.133/>

<http://13.218.27.133/dev/frontend/>



THANK YOU