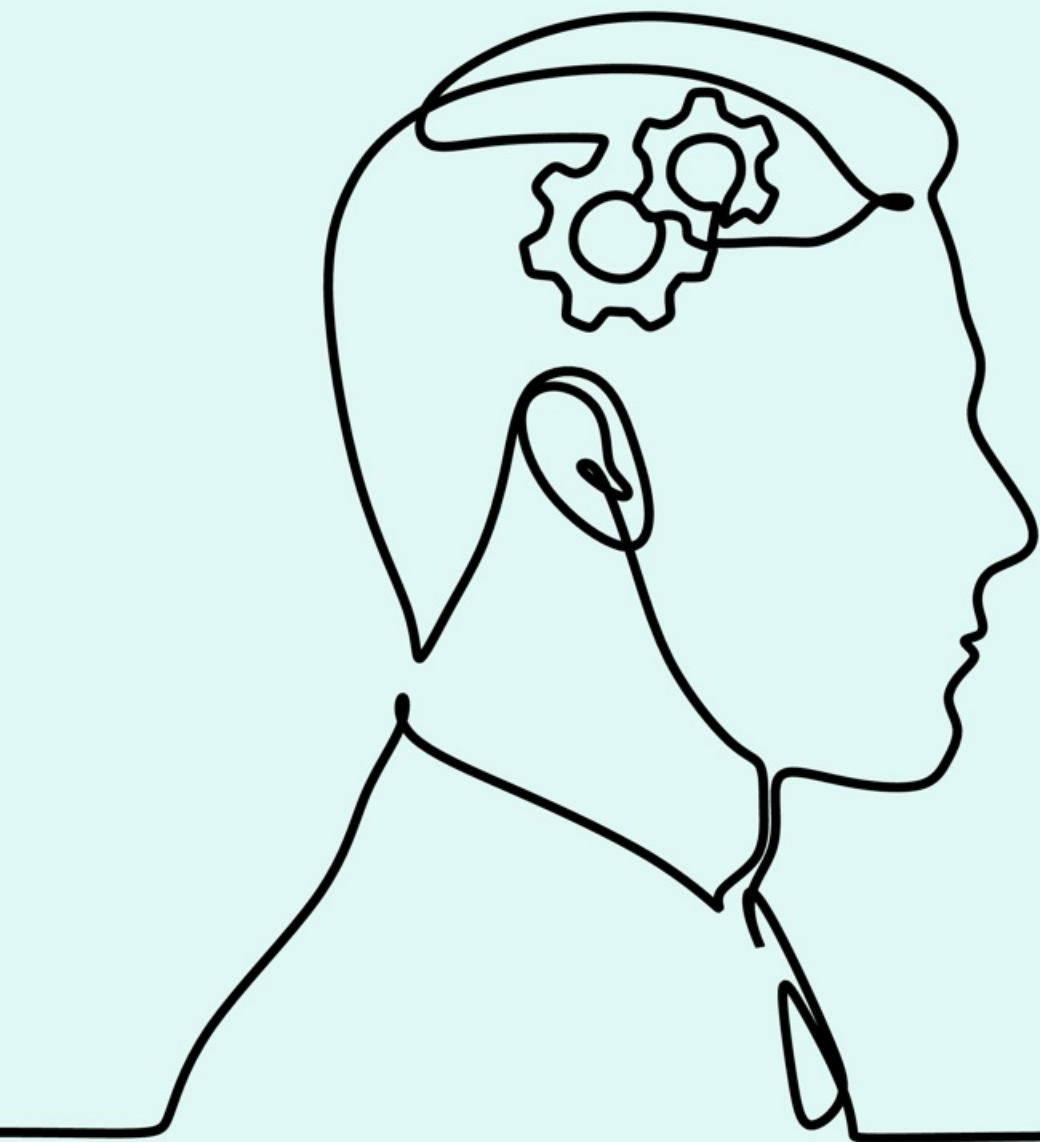


From Ideas to Implementation streamlining military hospital operations in Taiwan



Director of the Information Department,
Kaohsiung Armed Forces General Hospital

Presenter: Cheng, Chung-Nan(Nickle)

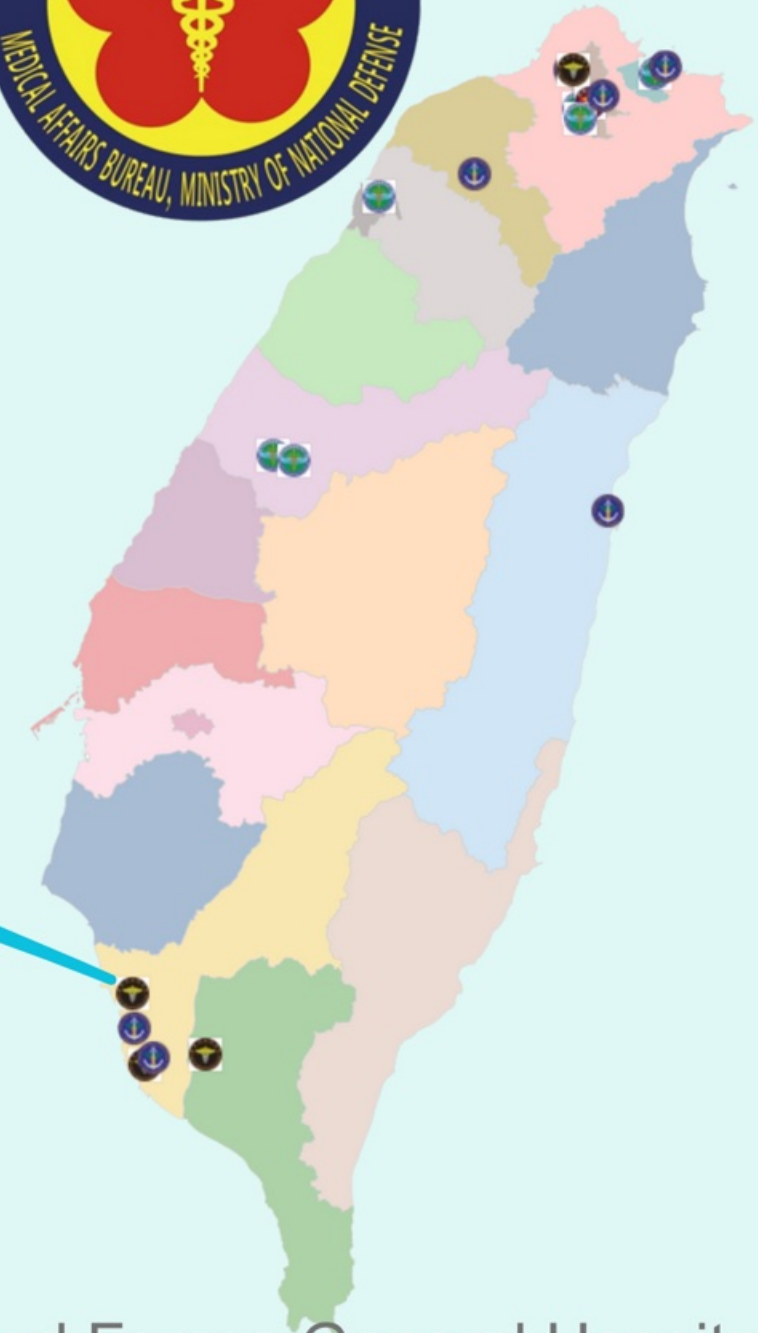
December 06, 2024

ABOUT ME



**My name is Nickle
I'm from Kaohsiung, Taiwan**

14 military hospitals

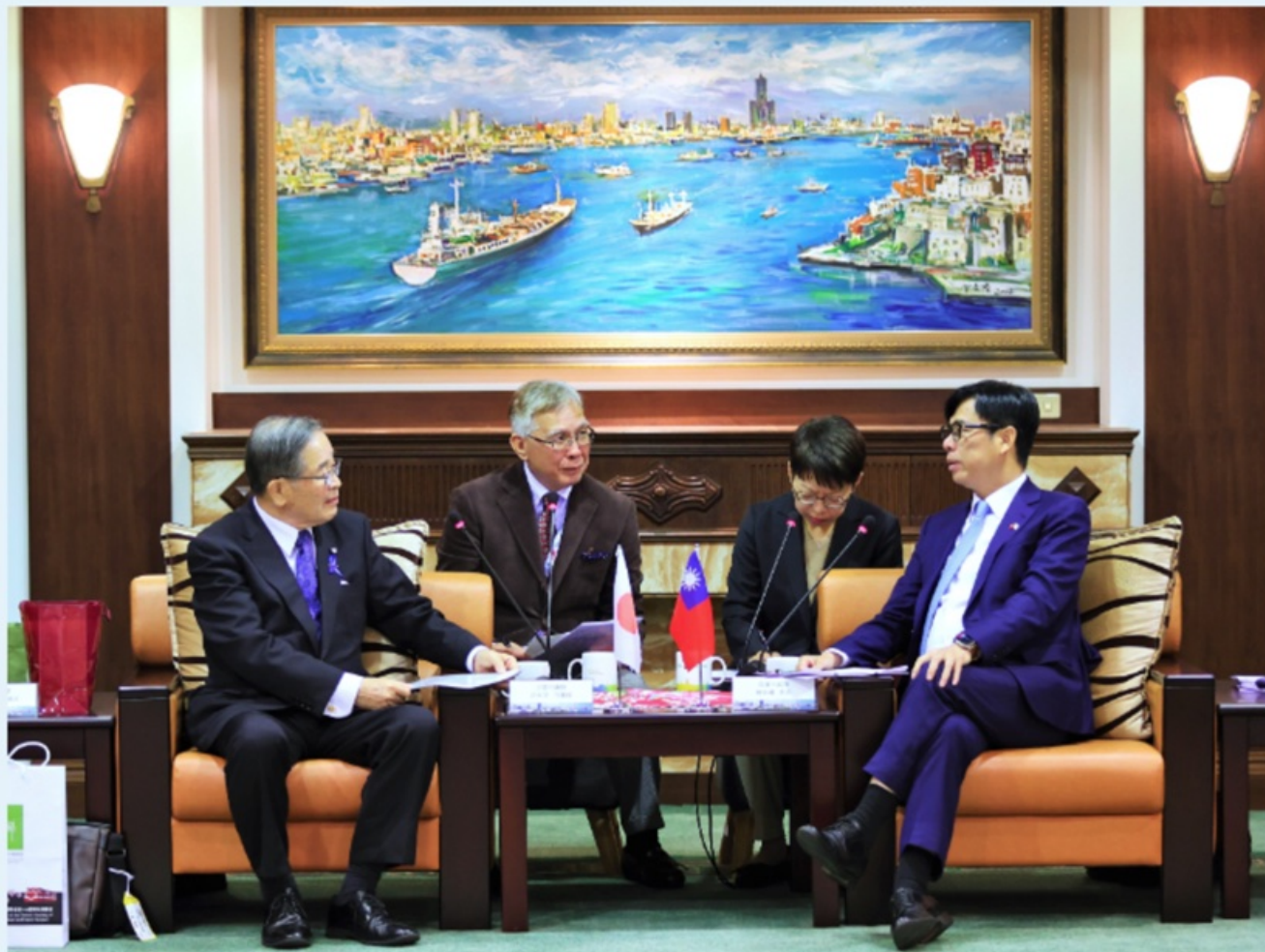


The Mayor of Kaohsiung stated: "Kaohsiung is the most friendly city toward Japan."

国際交流の最新ニュース

令和6年1月24日

日本の「神の国」出雲市議会議員団がガオ・チェンチーマイを訪問：両市が多角的に交流し、台湾と日本の友好が深まることを期待しています。



資料更新時
本日（24日）、日本の島根県出雲市議会議員7名が高雄陳其梅市長と会談し、観光、中等教育、教育分野において意見交換した。農業。出雲市は日本の「神の国」として、出雲市には長い歴史があり、豊かな産物があり、有り、その風景を体験するために多くの台湾人観光客を惹きつけるだろうと、陳其梅市長は述べた。私たちはまた、将来的には、公的または民間の交流ルートを通じて、二国間関係を深め、都市の共通の繁栄を達成できることを願っています。

More exchanges
on Ruby and open
source

Welcome to Kaohsiung!

訪問中、陳奇梅氏はまず日本の友人たちに能登半島地震に対する哀悼の意を表し、台湾人も同様の気持ちを持ち、被災地の復興と通常の生活の早期回復を願って寄付金で応える行動をとった。できるだけ。日本の311地震

に対する台湾の寄付、921台湾地震に対する日本の即時支援、あるいは新型コロナウイルス感染症の流行下での日本から台湾への450万回分のワクチン

へ
トップ



AGENDA

- **Ruby and Me**
- **Small Victories(MVPs)**
- **Big Platform(Integration)**
- **The Future**





1. RUBY & ME



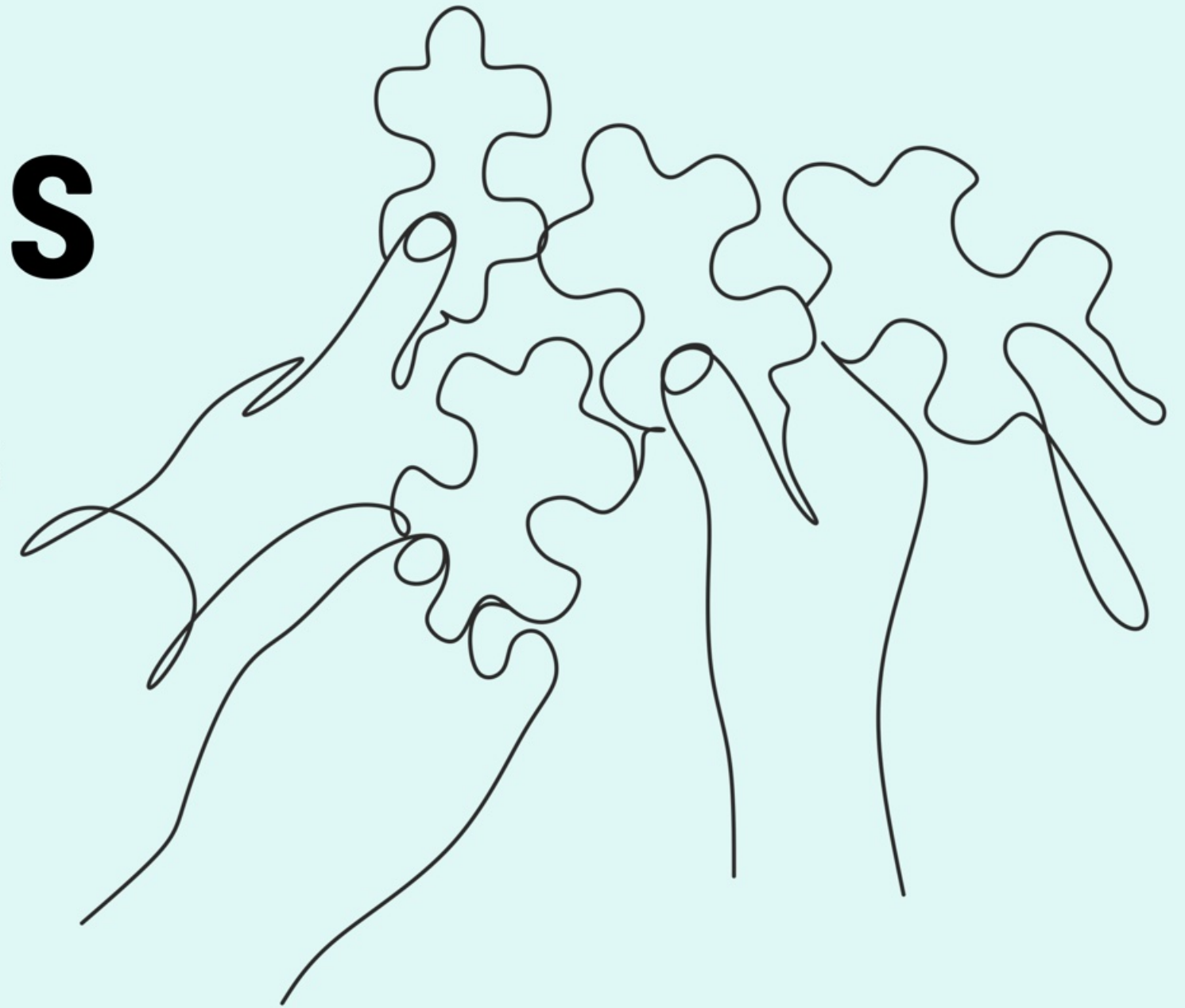
Ruby, Rails and My Open Source History

| YEAR | 1995 | 2001 | 2003 | 2005 | 2007 | 2010 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|--------------|------|---------------------------------|---|------------------------------------|--|-----------|--|--|----------------------------------|-----------|-----------|----------|-----------|--------------------------------|-----------|-----------------------------------|--------------|
| Ruby | 1.0 | - | 1.8 | - | 1.9 | - | 2.0 | 2.1, 2.2 | 2.3 | 2.4 | - | 2.5, 2.6 | 2.7 | 3.0 | 3.1 | 3.2 | 3.3 |
| Rails | - | - | - | Rails 1.0 | Rails 2.0 | Rails 3.0 | Rails 4.0 | Rails 4.2 | - | Rails 5.0 | Rails 5.1 | - | Rails 6.0 | Rails 6.1 | Rails 7.0 | - | - |
| Me | - | Oscommerce(PHP) ZH-TW community | Oscommerce ISBN: 986-7693-36-1, Start working at military hospital | Oscommerce ISBN: 978-986-7198-65-5 | Establish Taiwan Open Source Ecommerce Association | - | The Golden Age of Rails, Taiwan | The Golden Age of Rails, Taiwan | First met Redmine, Docker | - | - | - | - | Start seriously learning Rails | COVID-19 | First Rails MVP (COVID-19) | ISQua, Seoul |



2. Small Victories

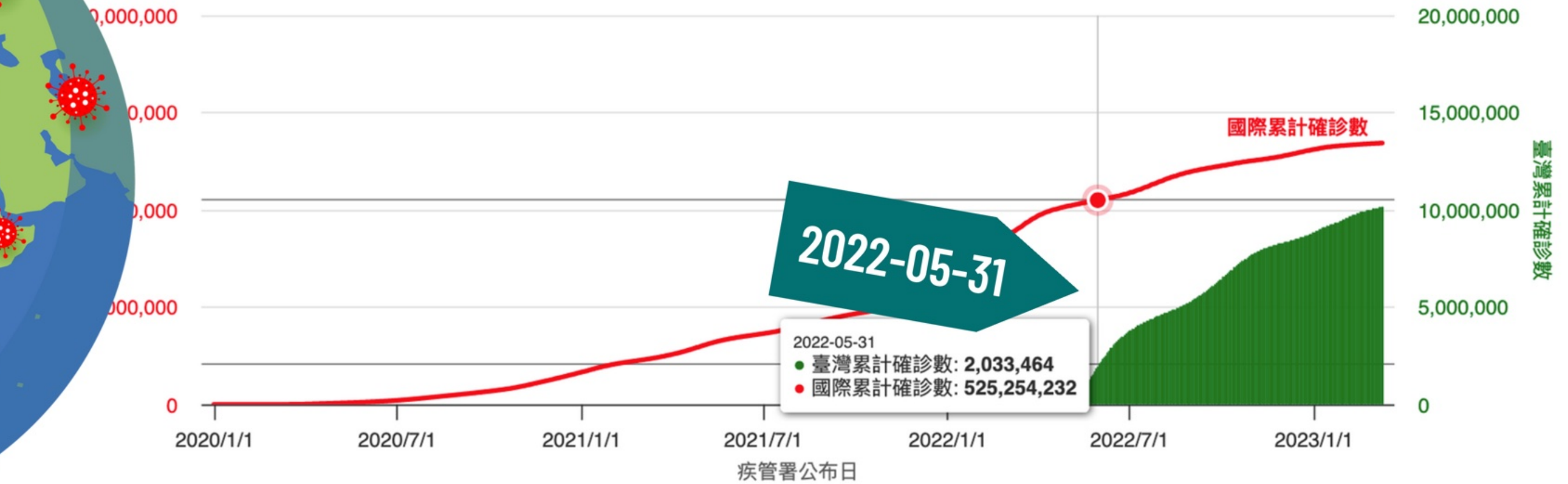
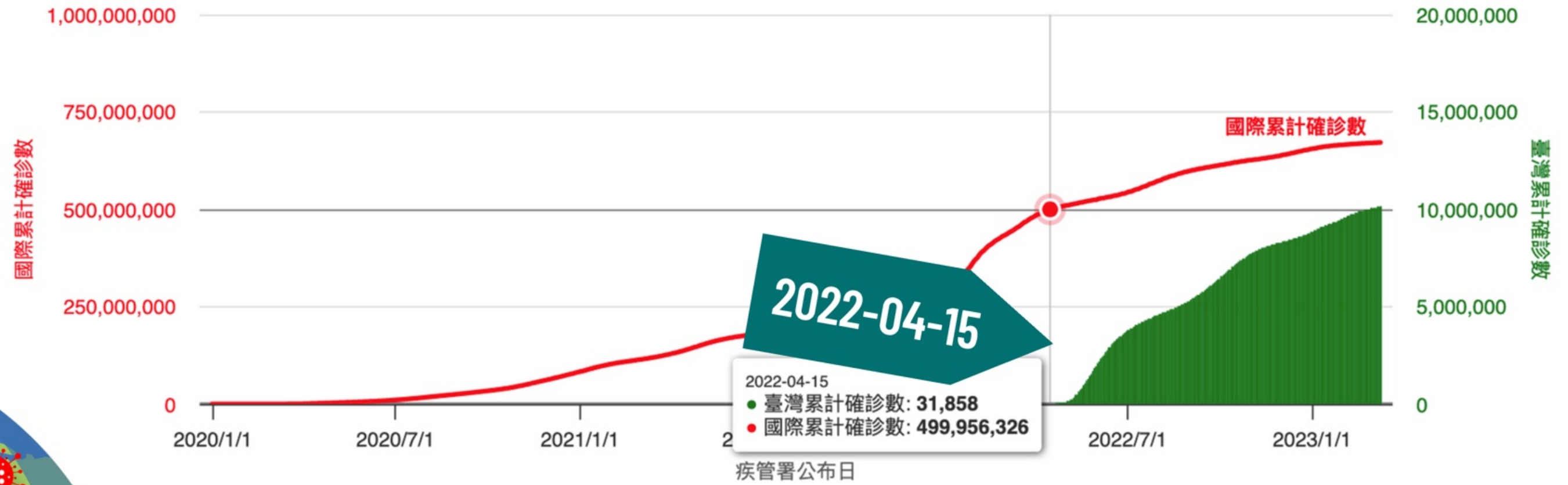
MVPs Minimal Viable Products



COVID-19



COVID-19 疫情發展圖



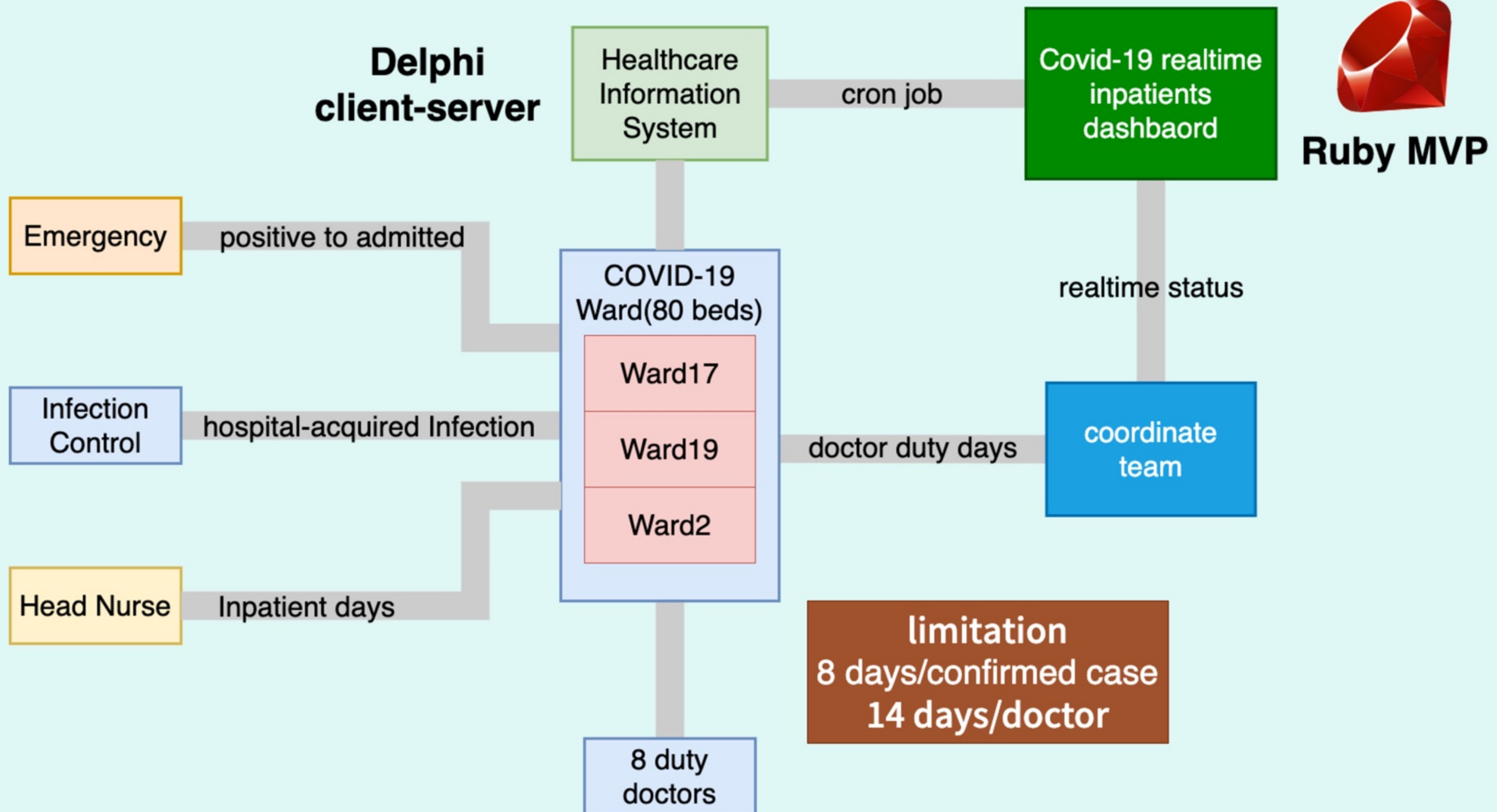
● 臺灣累計確診數 ● 國際累計確診數





MVP 1

COVID-19 inpatients Real-time Dashboard Architecture





MVP 1

COVID-19 inpatients Real-time Dashboard User Story

- As the **ward coordinator**, I need to know the **real-time** count of hospitalized **patients with positive PCR tests** across the hospital to help with **bed allocation**.
- As an **inpatient service staff member**, I need to know **the positive cases in general wards** to facilitate their **transfer to covid-19 wards**.
- As an **inpatient service staff member**, I need to know which patients in covid-19 wards **have been there for 8 days** to arrange their **transfer to buffer wards**.





MVP 1

COVID-19 inpatients Real-time Dashboard Develop

The screenshot displays a code editor with the following content:

```

class PcrsController < ApplicationController
  # POST /pcrs
  def create
    @pcr = Pcr.new(pcr_params)

    if @pcr.save
      redirect_to pcrs_url, notice: "Pcr was successfully create"
    else
      render :new, status: :unprocessable_entity
    end
  end

  # PATCH/PUT /pcrs/1
  def update
    if @pcr.update(pcr_params)
      redirect_to pcrs_url, notice: "Pcr was successfully update"
    else
      render :edit, status: :unprocessable_entity
    end
  end

  # DELETE /pcrs/1
  def destroy
    @pcr.destroy
    redirect_to pcrs_url, notice: "Pcr was successfully destroyed"
  end

  def sync
    PcrService.new.inpatient
    redirect_to root_path
  end

  private

  # Use callbacks to share common setup or constraints between
  def set_pcr
    @pcr = Pcr.find(params[:id])
  end

  # Only allow a list of trusted parameters through.
  def pcr_params
    params.require(:pcr).permit(:ca_inseq, :ca_medno, :mh_name)
  end
end

```

The Git Graph shows a series of commits with the following descriptions:

- add: 新增 sideiq
- add: 新增排序功能
- add: 增加代轉入專責病房人數
- fix: 修正排序問題
- fix: 修正同時多人按手動更新，筆數會重複的問題
- add: 修正轉出天數
- add: 加入 turbo stream 及中文語系
- add: 新增手動更新
- add: 新增首頁看板及查詢功能
- add: 新增 pcr scaffold
- add: orm 實作
- add: 使用 orm 方式實作
- add: 修改說明文件
- add: 修改說明檔名錯誤
- add: 修正 model 及關聯
- add: 調整model
- add: 修正 redame
- add: docs and er_model

Jun 1, 2022 Jun 3, 2022

3 days One person

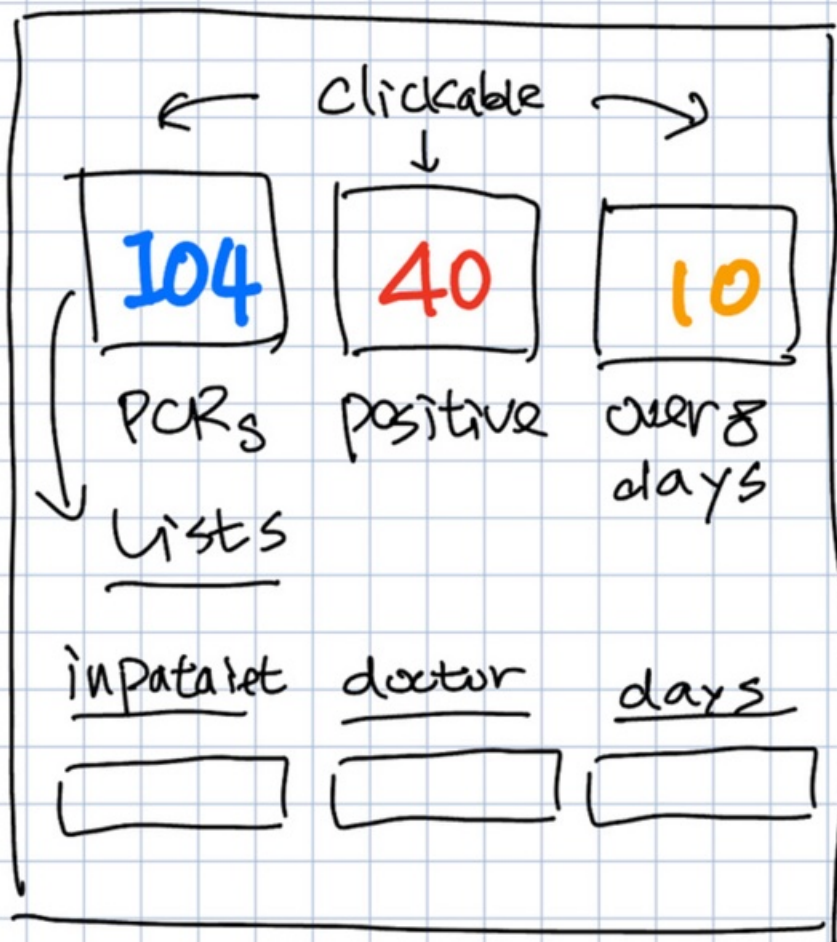




MVP 1

COVID-19 inpatients Real-time Dashboard Result

Covid-19 inpatients



國軍高雄總醫院 Covid-19 專責病房動態看板

PCR 陽性報告 8 天後可轉出專責病房

109 31/78
PCR 陽性住院人數

38 26/12
超過 8 天人數

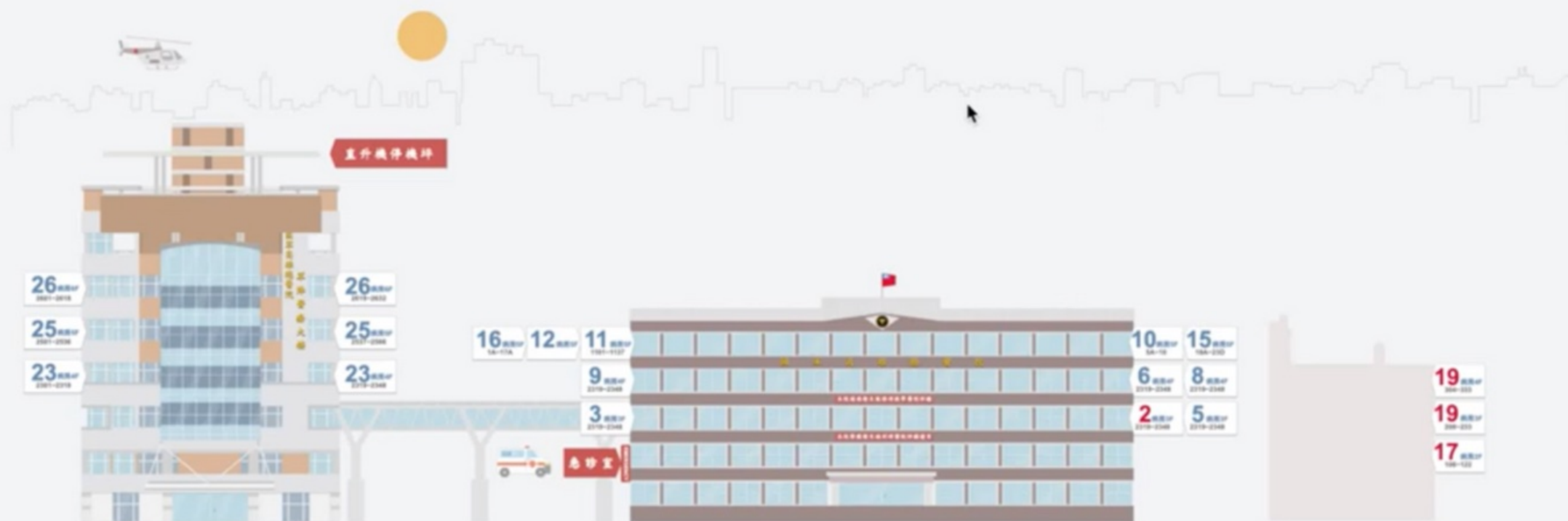
5 0
等待轉入專責病房人數

12 0
可轉出專責病房人數

建議使用 Chrome 或 Safari 瀏覽器，請勿使用舊版 IE

更新時間：2022-06-05 10:10:45 (每 10 分鐘自動更新)

手動更新





MVP 1

COVID-19 inpatients Real-time Dashboard Result

**Bringing Ruby into
International Sociality for
Quality in Health Care
(ISQQua)**





MVP 2

KIOSK Inpatient list



Staff print the list every workday morning at 8:00





MVP 2

KIOSK Inpatient list Develop

Jun 13, 2024 Jun 16, 2024

3 days One person

The screenshot displays a development environment with several components:

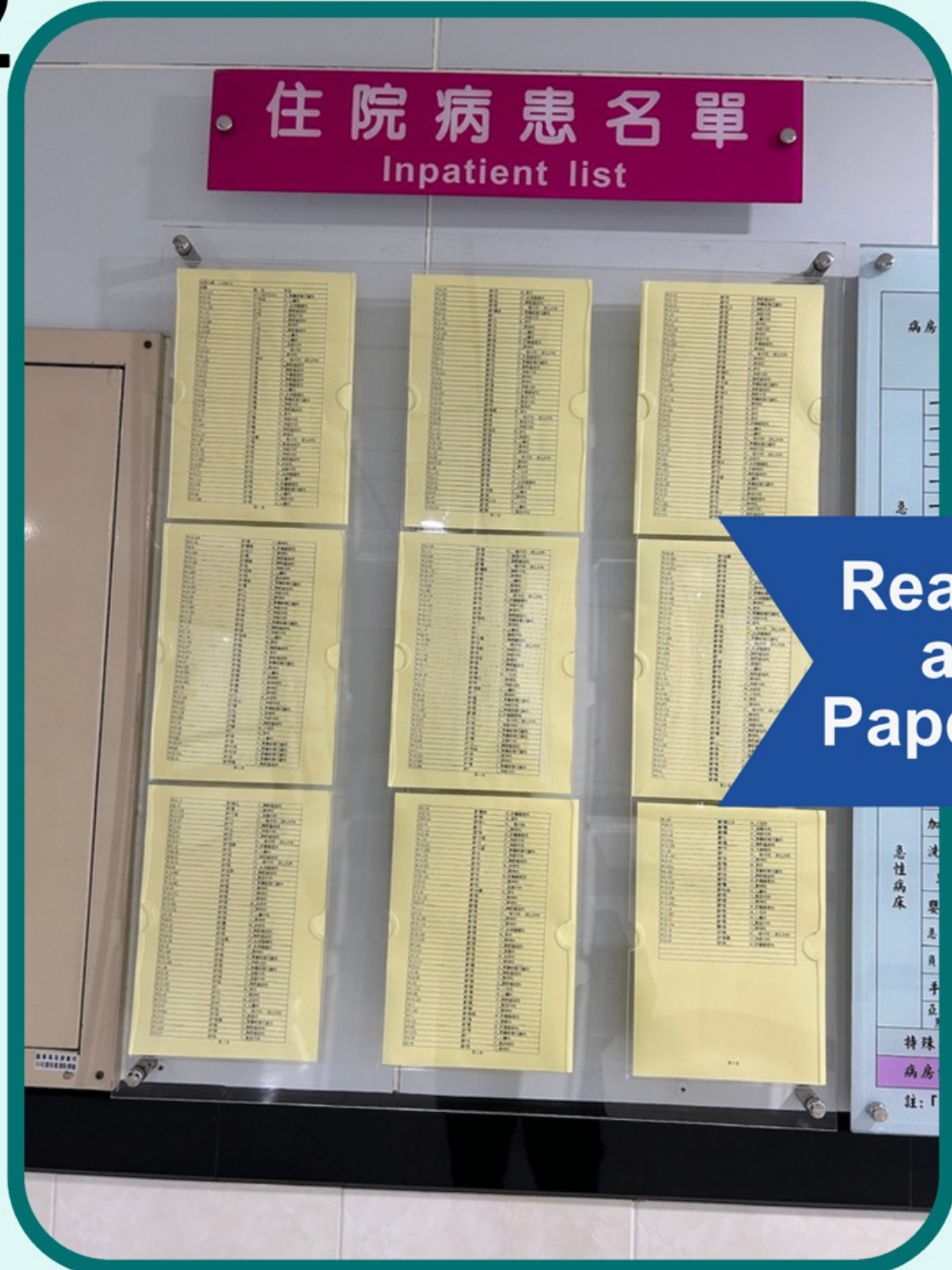
- File Explorer:** Shows a project structure for 'KIOSK' with folders like 'app', 'assets', 'builds', 'config', 'images', 'health_icons', 'heroicon', and files like 'avatar.png', 'building.svg', 'favicon.drawio.png', 'logo_text.drawio.svg', 'logo.drawio.svg', 'medical_center-200x112.svg', 'stylesheets', 'channels', 'controllers', 'helpers', 'javascript', 'jobs', and 'mailers'.
- Code Editor:** Shows the content of a `.gitlab-ci.yml` file with stages for build, test, and deploy, and variables for deployment server, path, and user.
- Git Graph:** Shows a commit history with messages such as 'update database ans credential', 'update ui/ux', 'Merge branch 'develop'', 'Update ldap.yml', 'Update connection.rb', 'Update 20240613031453_add_column_uid_to_users.rb', 'Update 20240613030859_create_services.rb', 'Update 20240613030857_devise_create_users.rb', 'update migrate version', 'rename folder', 'Upload New File', 'Add new directory', 'update oracle client', 'update gitlab-ci', 'update ui/ux', 'update sidekiq', 'add gitlab-ci', 'add UI/UX', 'add favicon', 'add profile and patch sidebar', 'update his oracle env setup', and 'Initial commit'.





MVP 2

KIOSK Inpatient list Result



Realtime and Paperless



Raspberry Pi 5



inpatient last name list

UI/UX



Easy to find



LINE Bot Develop

MVP 3..N

```

1 module Lines
2   class MessagingService < Line::Bot::Client
3     alias client itself
4     include Lineable
5
6     def initialize
7       @event = nil
8       @text = nil
9       @member = nil
10      @session = nil
11
12      options = {
13        channel_id: APP_CONF[:channel_id],
14        channel_secret: APP_CONF[:channel_secret],
15        channel_token: APP_CONF[:channel_token],
16        http_options: {
17          open_timeout: 5,
18          read_timeout: 5
19        }
20      }
21      super(options)
22    end
23
24    def handle_callback(body, host)
25      @host = host
26      events = client.parse_events_from(body)
27      events.each do |event|
28        @event = event
29        set_member
30        save_log
31        event_hash = event.as_json || {}
32        puts "====event_hash:#{event_hash.a
33        @text = event_hash.dig('message', 'text')
34        # @location = event_hash.dig('message')
35        puts "====@text:#{@text}===="
36        # 判斷 line 回傳的類別
37        func_name = ['deal_with', event['type'].underscore,
38
39        puts "====func_name: #{func_name}===="
40        # binding.pry
41        self.send(func_name)
42      end

```

Branches: Show All

Show Remote Branches

| Graph | Description | Date | Author | Commit |
|-------|--|---------------|--------|----------|
| | Uncommitted Changes (1) | 6 Nov 202... | * | * |
| | deploy origin/deploy fixed ra... | 20 Oct 202... | nickle | dcce0717 |
| | fixed production 手術動態 | 20 Oct 202... | nickle | e74bcccb |
| | Merge commit '1c7d3543a8523c179c58... | 20 Oct 202... | nickle | 2f5c4125 |
| | add_drug_no add drug call number | 20 Oct 202... | nickle | 1c7d3543 |
| | add linepay | 19 Oct 202... | nickle | ea464615 |
| | add RAG feature | 10 Oct 202... | nickle | 2271dbf2 |
| | user_setting update user setting | 10 Oct 202... | nickle | fcae6e35 |
| | Merge commit '9034c2cf64a6669d95bf... | 25 Sep 20... | nickle | 122b0bf5 |
| | hotfix-1 fixed enable speech to olla... | 25 Sep 20... | nickle | 9034c2cf |
| | Merge commit '70d066efef580e8f0fa3c... | 24 Sep 20... | nickle | 1865e811 |
| | fix address not correctly issue | 24 Sep 20... | nickle | 70d066ef |
| | update user setting | 22 Sep 202... | nickle | 8b6f25b0 |
| | langchain Merge commit 'd9c952ab... | 20 Sep 20... | nickle | 0d073677 |
| | opd_checkin update clinic check-in | 20 Sep 20... | nickle | d9c952ab |
| | update check-in precess | 19 Sep 202... | nickle | 1a303464 |
| | Merge commit '84c94715f0c7eae6bb65... | 17 Sep 202... | nickle | d85f2292 |
| | outpatient_progress Merge commit '... | 17 Sep 202... | nickle | 84c94715 |
| | Merge commit '38ae2857f87f7a768608... | 17 Sep 202... | nickle | dc44bfa0 |
| | ollama update ollama message | 17 Sep 202... | nickle | 38ae2857 |
| | add ai ollama service | 17 Sep 202... | nickle | 4829554f |
| | Merge commit '4ae4288675ac36358edc... | 16 Sep 202... | nickle | f79fbe2f |
| | fixed operations | 16 Sep 202... | nickle | 4ae42886 |
| | Merge commit 'abf8a9486bc9816c27e8... | 15 Sep 202... | nickle | c97fdce0 |
| | fixed blood waiting people and credential... | 15 Sep 202... | nickle | abf8a948 |
| | update binding confirm | 15 Sep 202... | nickle | 54e67c20 |
| | Merge commit '3b27d9d5f07b3efc49f58... | 15 Sep 202... | nickle | a0225541 |
| | vhc update vhc | 15 Sep 202... | nickle | 3b27d9d5 |



▲民眾綁定「虛擬健保卡」及加入「保力買Line群組」，即可獲得50元~11商品卡。(圖 / 記者莊全成攝，2024.09.26)





MVP 3..N

Customer Data Platform Devlop

The screenshot displays a development environment with several components:

- Code Editors:**
 - `registrations_controller.rb`: Shows a Rails controller class with methods like `index`, `check_id`, and `esg`.
 - `tophbt.rb`, `_registration.html.erb`, and `idcard_controller.js` are also visible in the background.
- File Explorer:** Shows a project structure with folders like `app`, `controllers`, `users`, `fonts`, `helpers`, `javascript`, and `mixins`.
- Git Graph:** A table showing commit history:

| Graph | Description | Date | Author | Commit ID | |
|-------------------------|---------------------------------------|----------------|--------------|-----------|----------|
| Uncommitted Changes (2) | | 6 Nov 202... | * | * | |
| deploy | gitlab/deploy | 14 Oct 202... | nickle | 34d... | |
| Merge commit | '578b958852d3f1d... | 14 Oct 202... | nickle | 5ecf... | |
| callback | add callback | 14 Oct 202... | nickle | 578l... | |
| Merge commit | '4673610db167918a... | 12 Oct 202... | nickle | ca9f... | |
| | update development key | 12 Oct 202... | nickle | 0d4... | |
| | add create esign document | 12 Oct 202... | nickle | 467... | |
| | update api document | 12 Oct 202... | nickle | 288... | |
| | update gitlab-ci | 12 Jun 202... | nickle | e51t... | |
| | update deploy to production | 12 Jun 202... | nickle | b63... | |
| | update dockerfile | 12 Jun 202... | nickle | 503... | |
| | update gitlab-ci | 12 Jun 202... | nickle | 5fd56d38 | |
| | update gitlab-ci | 12 Jun 202... | nickle | 83077d9b | |
| | update gitlab-ci | 12 Jun 202... | nickle | 536e92cf | |
| | update gitlab-ci | 12 Jun 202... | nickle | 84cfe9a4 | |
| | add 出生地及菸檳榔酒史 | 12 Jun 202... | nickle | ef7eb6f4 | |
| | fix mail credential | 31 May 20... | nickle | 3be59300 | |
| | add production env action_mailer c... | 31 May 20... | nickle | e8aa455e | |
| | fix docker-compose.tpl master key | 31 May 20... | nickle | 379a5070 | |
| | fix gitlab-ci.yml | 31 May 20... | nickle | ee425e00 | |
| | Merge commit '32b19d227dfeabd6... | 31 May 20... | nickle | 8274d361 | |
| | staging | gitlab/staging | Mer... | 1ffc640 | |
| | add_survey_and_refactoring_svg | f | 31 May 20... | nickle | 32b19d22 |
| | Merge commit '3f7077b9de541e7c... | 31 May 20... | nickle | 4d473594 | |
| | fix new patient email | 31 May 20... | nickle | 3f7077b9 | |
| | Merge commit '13c317c0449c29a8... | 31 May 20... | nickle | 1b8845d6 | |
| | fix patient_info | 31 May 20... | nickle | 13c317c0 | |
| | Merge commit 'ce5fba5a5b9445b2... | 31 May 20... | nickle | 1dd5607f | |

The screenshot shows a website for a health check-up event. Key information includes:

- Event Title:** 免費健康檢查 (Free Health Check-up)
- Organizer:** 國軍高雄總醫院 (National Kaohsiung First University Hospital)
- Check-up Date:** 113年3月5日 (星期二) 上午 08:00-11:00
- Check-up Location:** 新海光里社區發展協會 (Xin Hai Guang Li Community Development Association)
- Check-up Items:**
 - 老人健檢 (Elderly Health Check): Includes MNA, blood pressure, cholesterol, etc.
 - 成人健檢 (Adult Health Check): Includes physical exam, urinalysis, vision, etc.
 - B/C 肝臟篩檢 (Liver Screening): For B and C型肝炎.
- Registration Info:** A form to register with fields for name, ID, date of birth, gender, phone number, and address.



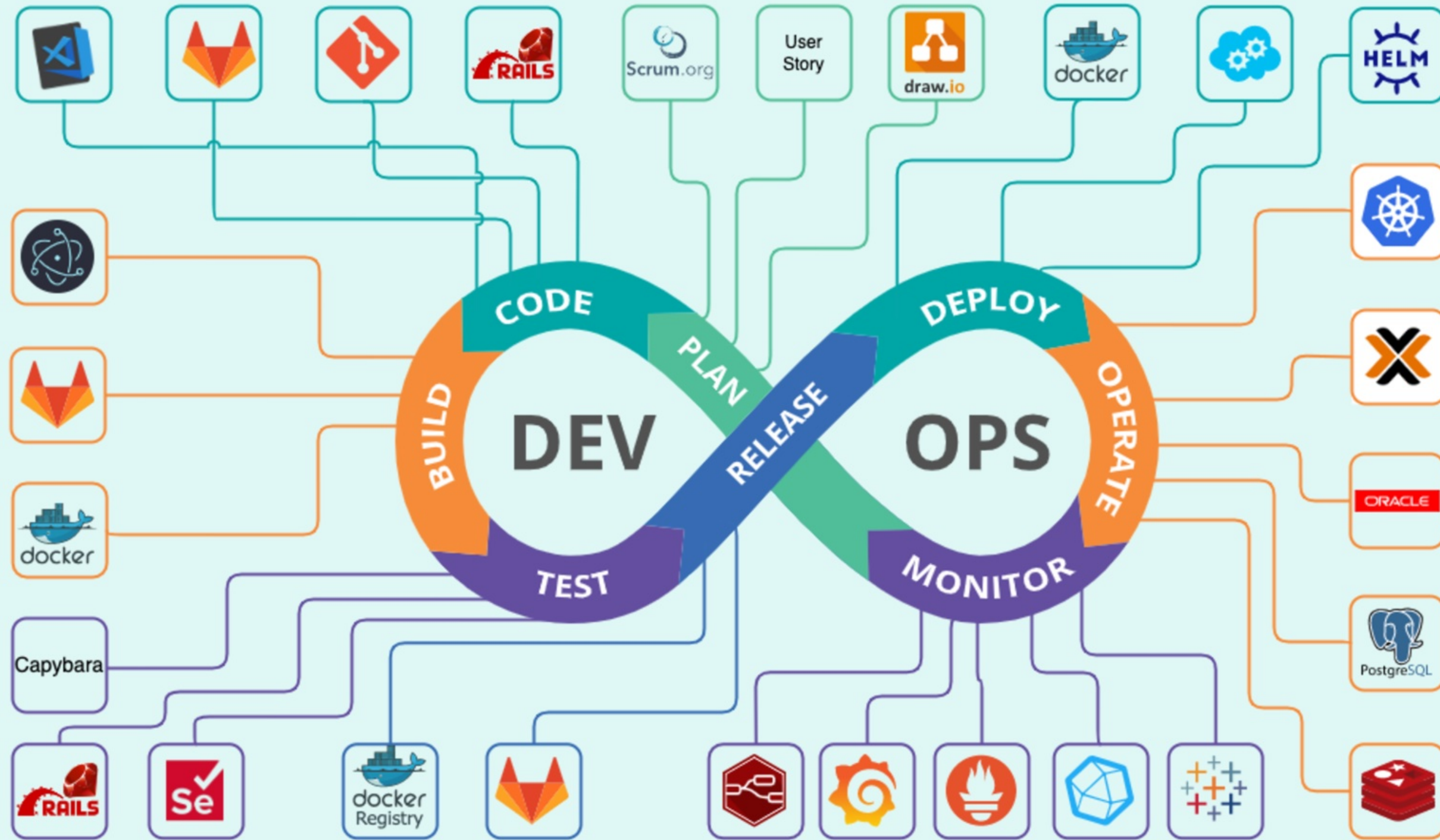
3. Big Platform

Integration





More and more MVPs and Software Need to integration





More and more MVPs and Software Need to integration

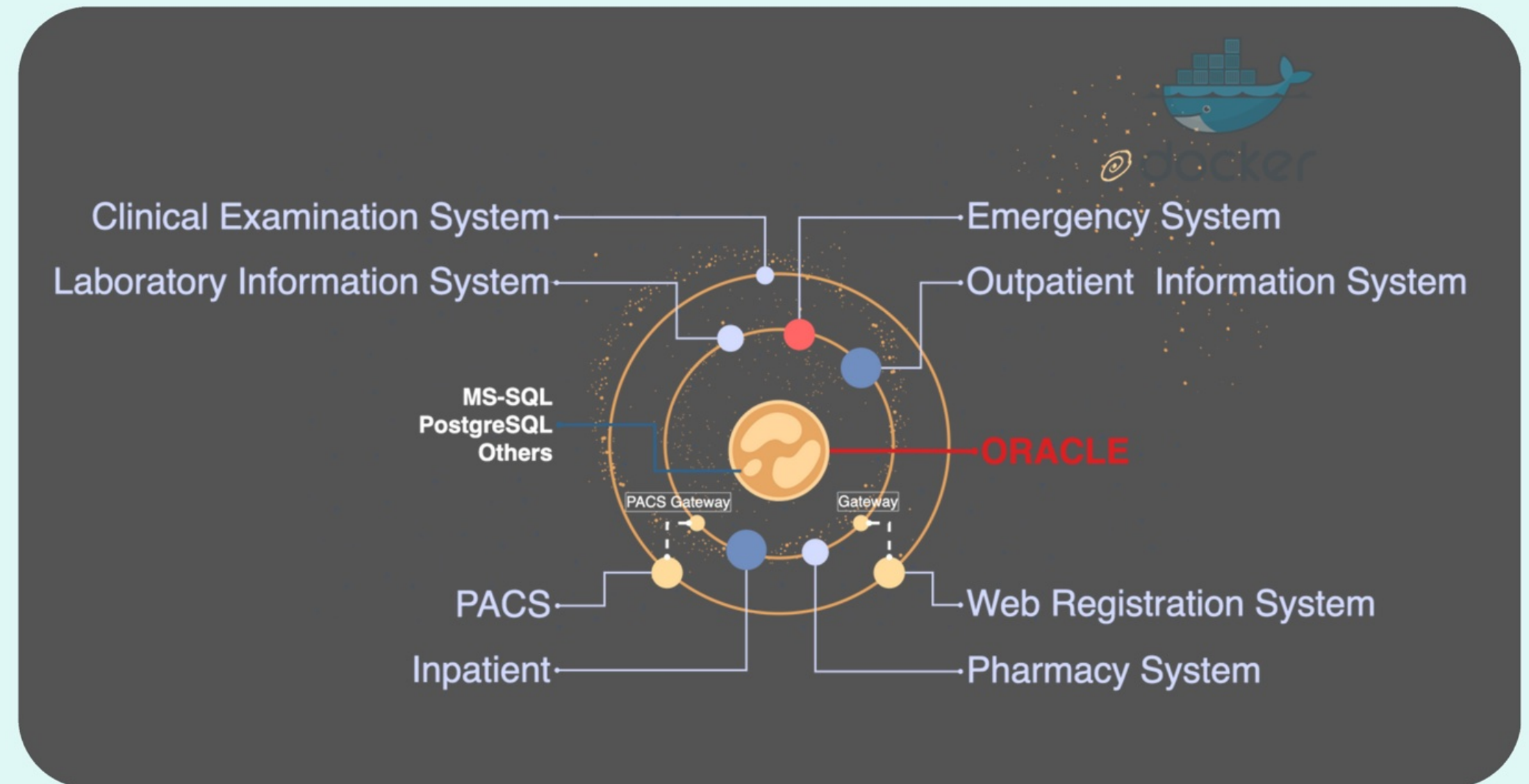
- Docker
- OpenLDAP
- Keycloak
- Database

Oracle

MS-SQL

PostgreSQL

...





Develop an employee portal integration using Ruby on Rails

Internal employee cloud

Generative (AI) Business Intelligence (BI) Administration medical

Website link + search

The application name or URL or description contains

- (100) Hospital website: National Military Kaoh...
- (102) EMR: Electronic medical rec...
- (102) Online registration: Online registration sys...
- (104) Esign: Cloud online signature...
- (104) (PoC)Esign: Audio and video signa...
- (106) V: Virtua...
- (108) TPR: In-hospital patient saf...
- (110) Mobile ward rounds: Mobile ward rounds s...
- (112) ECG AI: ECG upload to AI for i...
- (113) ECG AI report query: Three total ECG AI rep...
- (200) Redmine: Project Management ...
- (201) H: Perso...
- (202) Evaluation manag...: ID card/last six digits
- (204) Workflow: Form approval and rep...
- (206) Food Menu: Meal ordering function...
- (400) Moodle: Hospital online learnin...
- (402) Lime Survey: Online questionnaire p...
- (406) Cloud Office: Synology Cloud Office...
- (408) CC Mail: employee email
- (409) Grafana: HIS database host mo...
- (900) vmware server fa...: HIS database 192.168...
- (901) Electronic paper P...: The file is at http://dri...
- (999) HISAC Healthcare...: Critical infrastructure (...
- (999) China Information...: The account needs to ...

View all 24 apps

國軍高雄總醫院
Healthcare Cloud



RWC2024@Shimane Prefectural Convention Center, Japan, Dec 06, 2024



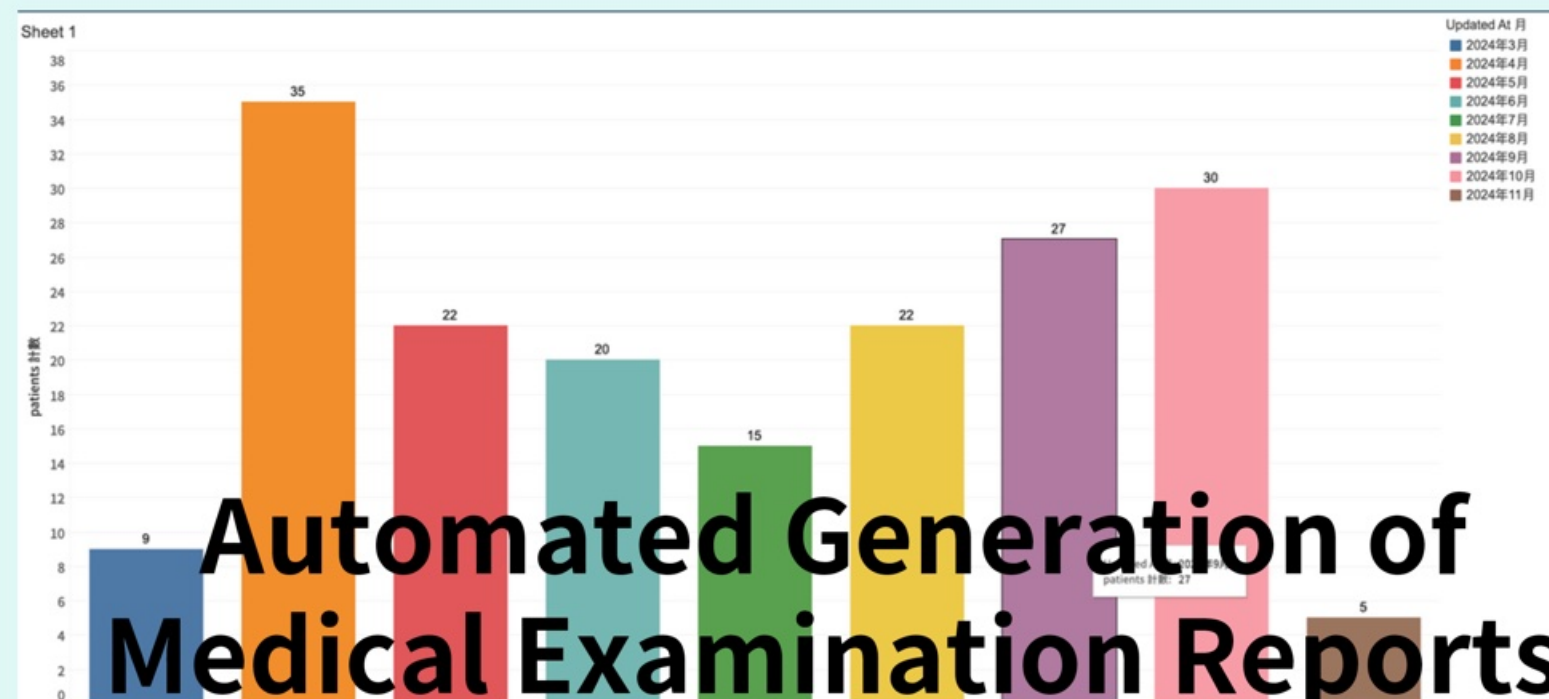
Kaohsiung Armed Forces General Hospital



MPV BI (Tableau)



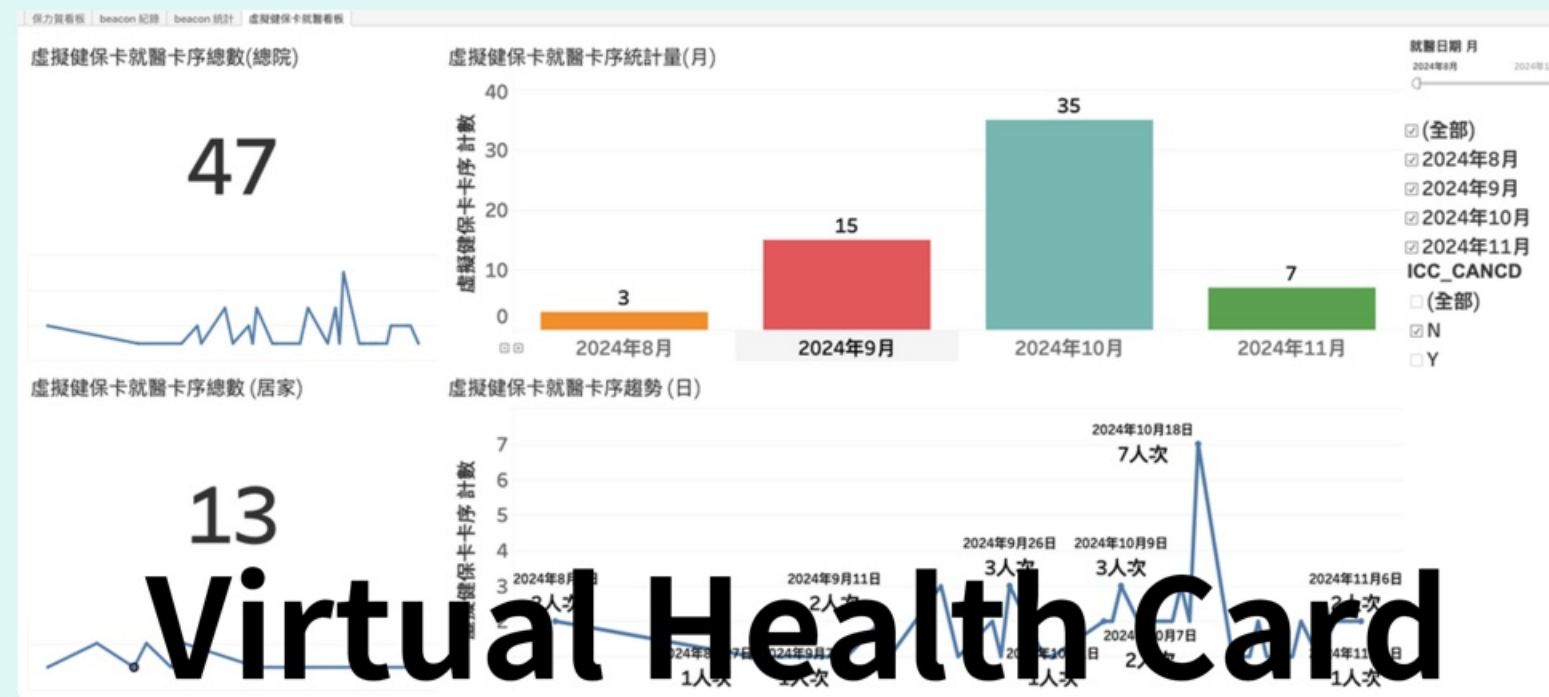
First registration E-Sign



Automated Generation of Medical Examination Reports



LINE Bot



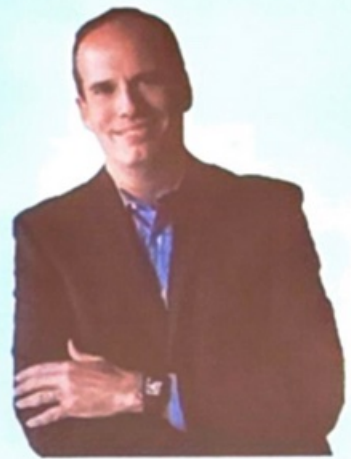
Virtual Health Card





Digital Healthcare Platform

SMART on FHIR



SMART (Substitutable Medical Apps, Reusable Technologies)

"FHIR standardizes healthcare data format, while SMART standardizes how applications can request and access this data."



Software Libraries

- [JavaScript or TypeScript](#): Client-side and server-
- [Node.js from Vermonster](#): An alternative Node.js
- [Python](#): Server-side Python library with support
- [R](#)
- [Ruby](#)
- [Swift \(iOS\)](#)
- [Java](#)
- [.NET](#): FHIR client library from Firely



Digital Healthcare Platform

Ministry of Healthcare and Welfare, Taiwan

衛生福利部
Ministry of Health and Welfare

Steps to Build a SMART on FHIR App (I)

- 選擇應用程式類型**
 - ✓ 面向提供者或患者的應用程式
 - ✓ 行動應用程式
 - ✓ 網路應用程式
 - ✓ 在現有的臨床應用程式中運行還是作為獨立的應用程式運行
- 使用者安全性驗證**
 - OpenID Connect
 - 2 OAuth 2.0**
 - 確保提供者可以在整合應用程式之間切換，而無需每次都輸入其憑證，也不需要第三方解決方案中輸入密碼，因為授權是透過他們的EHR系統進行的。系統擁有者可以在EHR系統中定義不同使用者的權限和存取等級。
 - 常規的符合 HIPAA 的應用程式開發程式 (包括資料加密、安全連線的使用等) 也適用於此。
- 使用 SMART 沙盒進行測試**
 - Public Sandboxes for Testing
 - SMART*, OPEN Epic, Allscripts, Cerner, Health Interactions, HSPC
 - 由於醫療保健應用程式使用的數據性質，測試醫療保健應用程式非常具有挑戰性。對於所有 SMART on FHIR 的開發者，建議使用 SMART 沙盒來測試應用程式的功能。
 - Epic 等 EHR 供應商也提供單獨的沙盒，透過使用其 EHR 系統測試開發者的產品。

Software Libraries for Developers: HTML5, Apple, Python, .NET, Ruby, Java

November 8, 2024

SMART on FHIR Ruby Gem



4. The Future



My Life



- I'm starting to feel like a real developer
- Make others believe that we can develop the healthcare system ourselves
- Able to quickly implement any ideas

We need more developers to come up with more ideas



MORE DEVELOPERS

In the next few years, We will hire more than 10 people Ruby and Rails developers



- **Make Ruby and Rails interesting again**
- **Make things simple again**
- **Make ideas easy to implement again**
- **Make healthcare software simple again**

It's hard, but worth doing

**CROSS
DOMAIN**

**FULL
STACKER**

DEVOPS

THANK YOU FOR LISTENING



nickle@mail.802.org.tw
nickle.cheng@gmail.com

