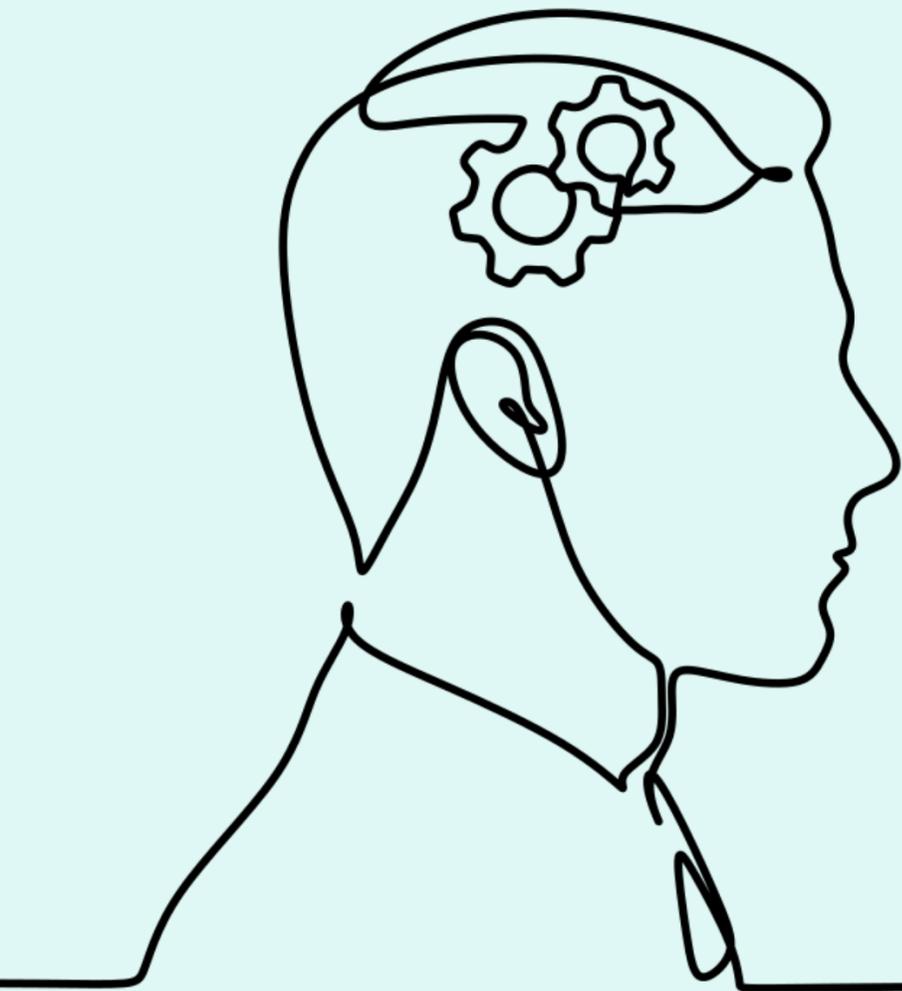


From Ideas to Implementation streamlining military hospital operations in Taiwan



**Director of the Information Department,
Kaohsiung Armed Forces General Hospital**

Presenter: Cheng, Chung-Nan(Nickle)

December 06, 2024

1/31



ABOUT ME



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

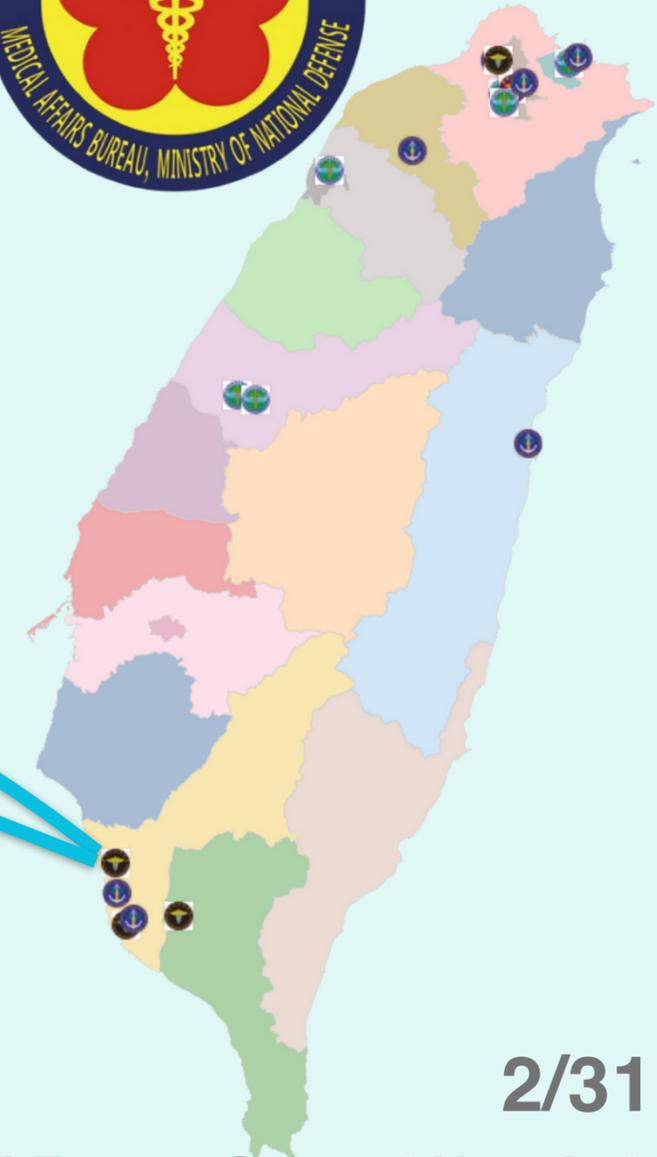
14 military hospitals



National Kaohsiung Center for the Arts (Weiwuying)



Kaohsiung Armed Forces General Hospital
Superintenden: General Wu, Sheng-Tang
Beds: 727
Doctors: 150
Employees: 1,400

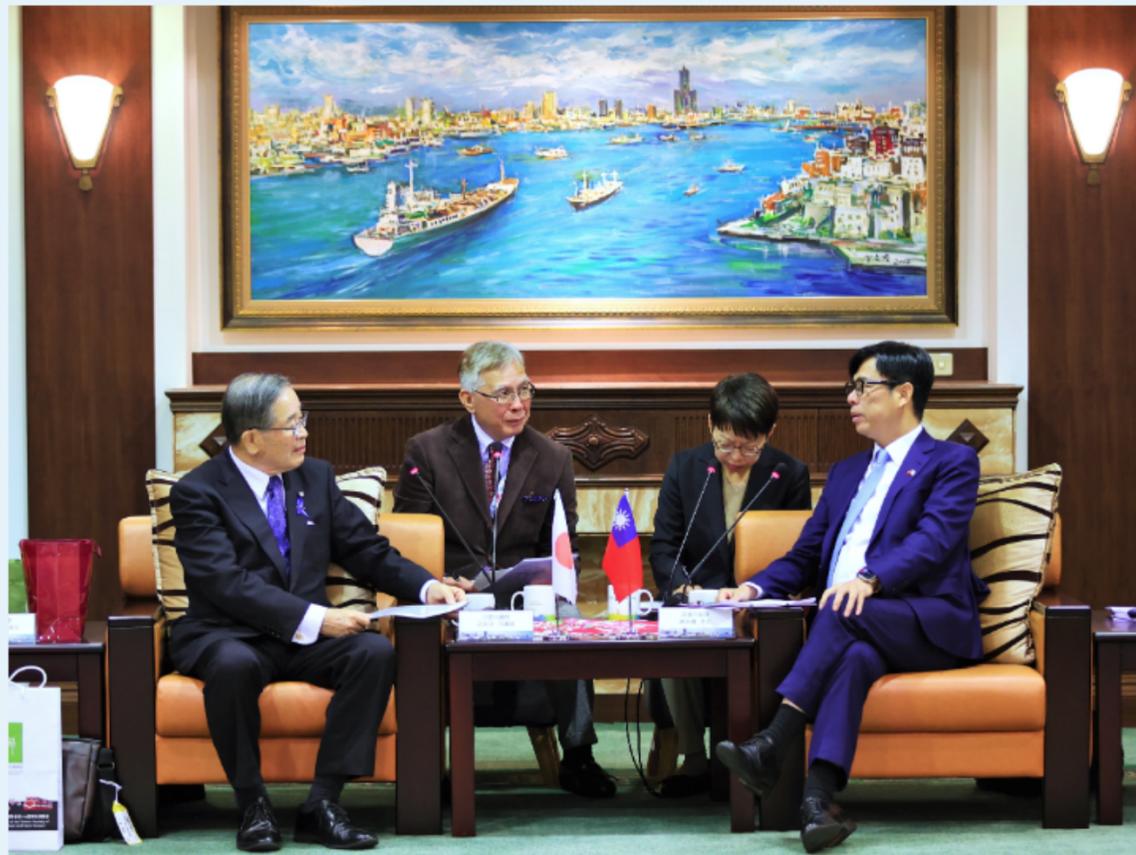


The Mayor of Kaohsiung stated: "Kaohsiung is the most friendly city towards Japan."

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
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、有名な出雲大社があり、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

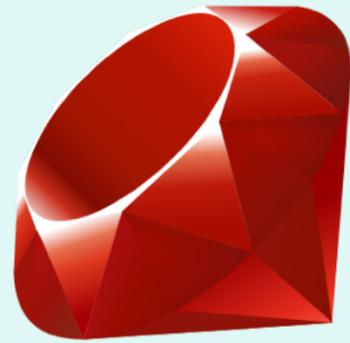
へ
トップ



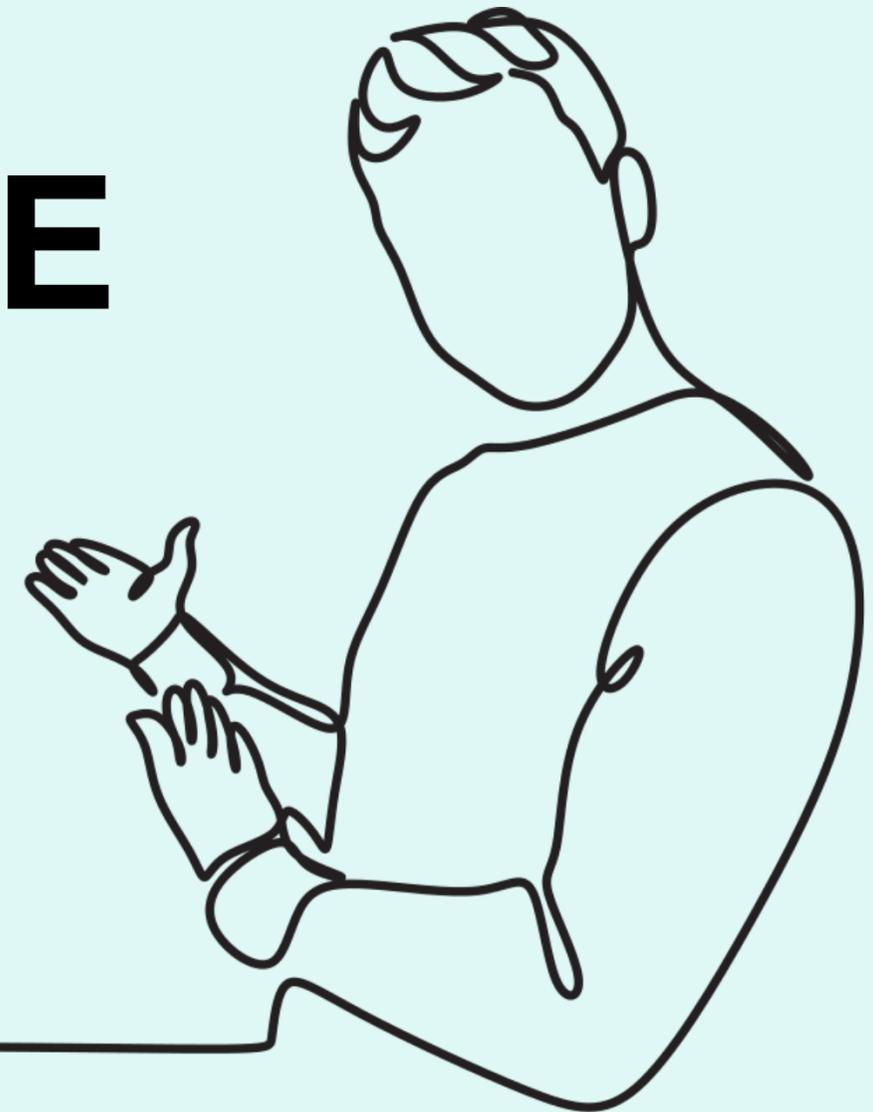
AGENDA

- **Ruby and Me**
- **Small Victories(MVPs, Minimum Viable Products)**
- **Big Platform(Integration)**
- **The Future**





1. RUBY & ME



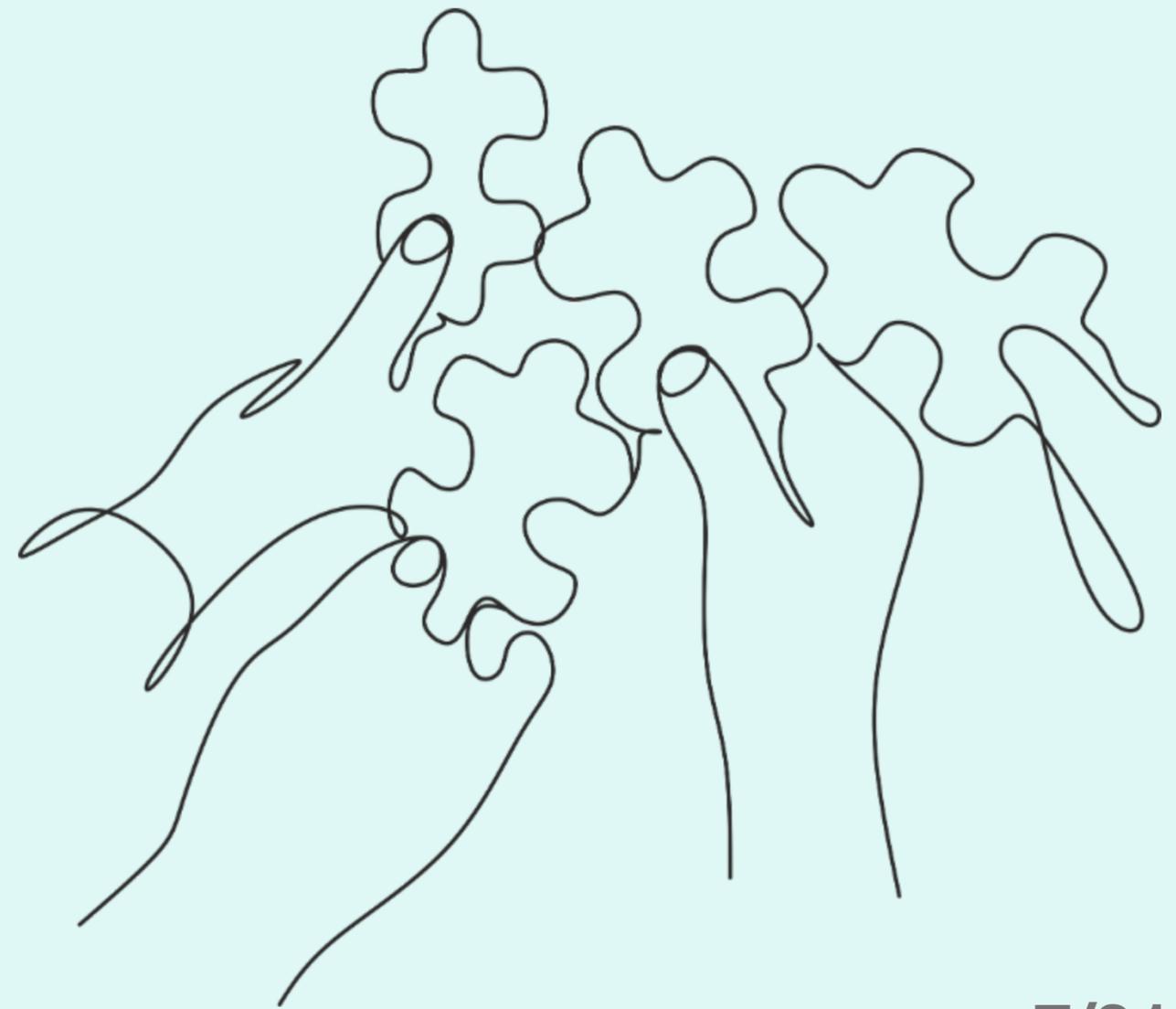
RUBY, RAILS AND MY OPEN SOURCE HISTORY

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

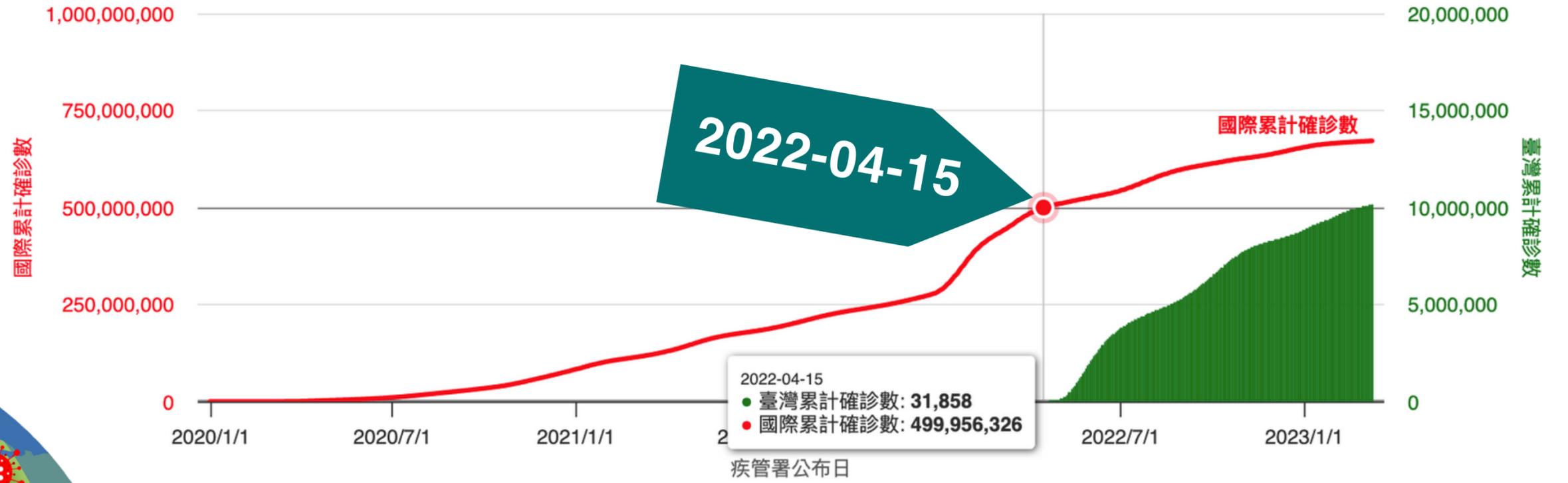
MVPs Minimum Viable Products



COVID-19



COVID-19 疫情發展圖



COVID-19 疫情發展圖



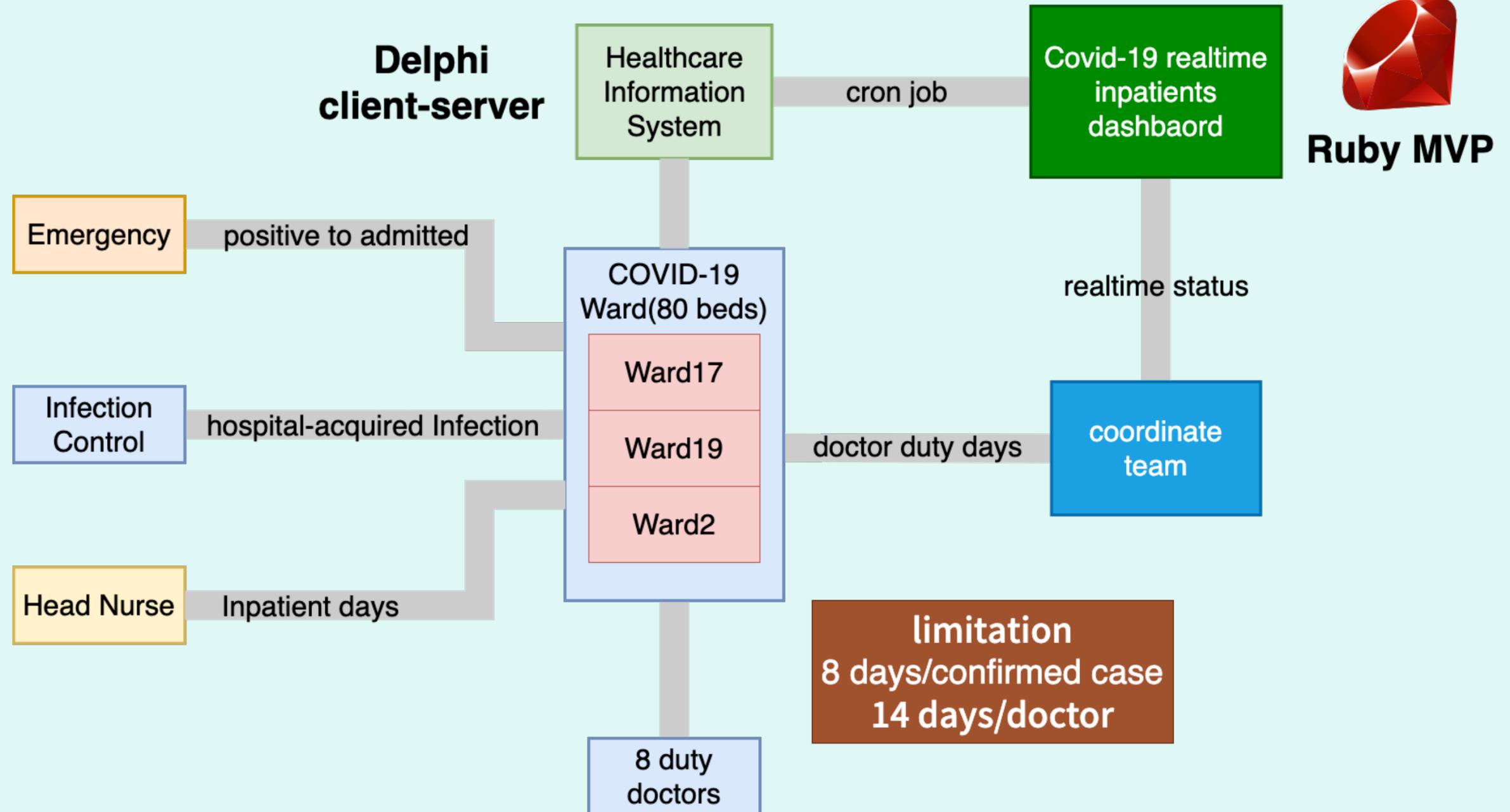
● 臺灣累計確診數 ● 國際累計確診數





MVP 1

COVID-19 INPATIENTS REAL-TIME DASHBOARD ARCHITECTURE



9/31





COVID-19 INPATIENTS REAL-TIME DASHBOARD

USER STORY

MVP 1

1. 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**.
2. As an **inpatient service staff member**, I need to know **the positive cases in general wards** to facilitate their **transfer to covid-19 wards**.
3. 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**.

10/31





COVID-19 INPATIENTS REAL-TIME DASHBOARD DEVELOP

MVP 1

The image shows a code editor with a file explorer on the left and a Git Graph on the right. The code editor displays the `pcrs_controller.rb` file with the following content:

```

1 class PcrsController < ApplicationController
27   # POST /pcrs
28   def create
29     @pcr = Pcr.new(pcr_params)
30
31     if @pcr.save
32       redirect_to pcrs_url, notice: "Pcr was successfully create
33     else
34       render :new, status: :unprocessable_entity
35     end
36   end
37
38   # PATCH/PUT /pcrs/1
39   def update
40     if @pcr.update(pcr_params)
41       redirect_to pcrs_url, notice: "Pcr was successfully update
42     else
43       render :edit, status: :unprocessable_entity
44     end
45   end
46
47   # DELETE /pcrs/1
48   def destroy
49     @pcr.destroy
50     redirect_to pcrs_url, notice: "Pcr was successfully destroy
51   end
52
53   def sync
54     PcrService.new.inpatient
55     redirect_to root_path
56   end
57
58   private
59   # Use callbacks to share common setup or constraints between
60   def set_pcr
61     @pcr = Pcr.find(params[:id])
62   end
63
64   # Only allow a list of trusted parameters through.
65   def pcr_params
66     params.require(:pcr).permit(:ca_inpeq, :ca_medno, :mh_nam
67   end

```

The Git Graph on the right shows a series of commits with the following messages:

- 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



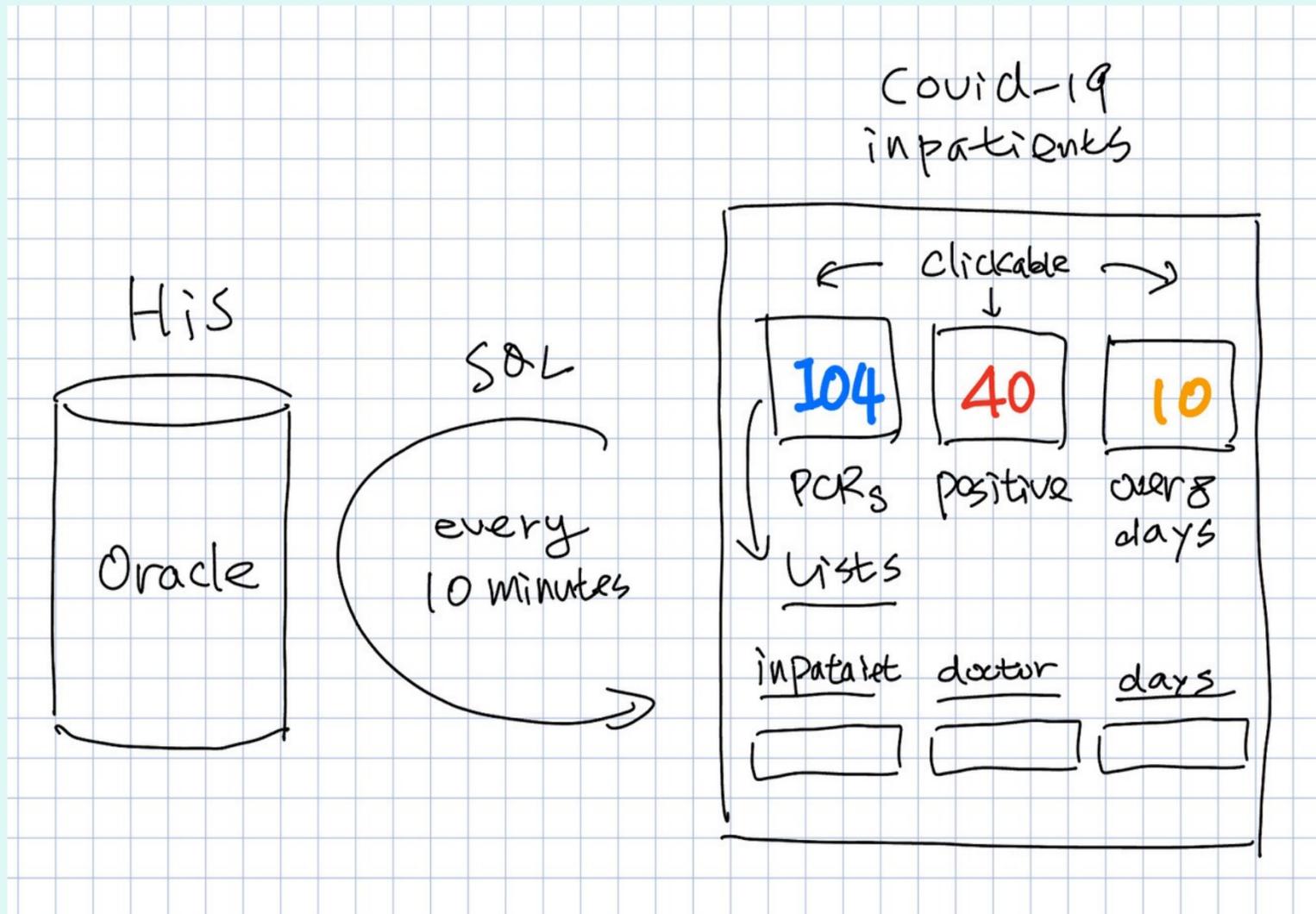
11/3





MVP 1

COVID-19 INPATIENTS REAL-TIME DASHBOARD RESULT





MVP 1

COVID-19 INPATIENTS REAL-TIME DASHBOARD RESULT

BRINGING RUBY INTO
INTERNATIONAL
SOCIALITY FOR QUALITY
IN HEALTH CARE
(ISQUA)



13/31





MVP 2

KIOSK INPATIENT LIST

Staff print the list every workday morning at 8:00





KIOSK Inpatient list Develop

MVP 2

The screenshot displays a development environment with several components:

- File Explorer:** Shows a project structure for 'KIOSK' with subfolders like 'app', 'assets', 'builds', 'config', 'images', 'health_icons', 'heroicon', and 'mailers'.
- .gitlab-ci.yml:** A configuration file for CI/CD with stages: build, test, and deploy. It includes variables for deployment server, path, and user, and a build script using Docker.
- Git Graph:** A visual representation of the commit history, showing a vertical timeline of commits with their messages and dates.

Jun 13, 2024 Jun 16, 2024

3 days One person



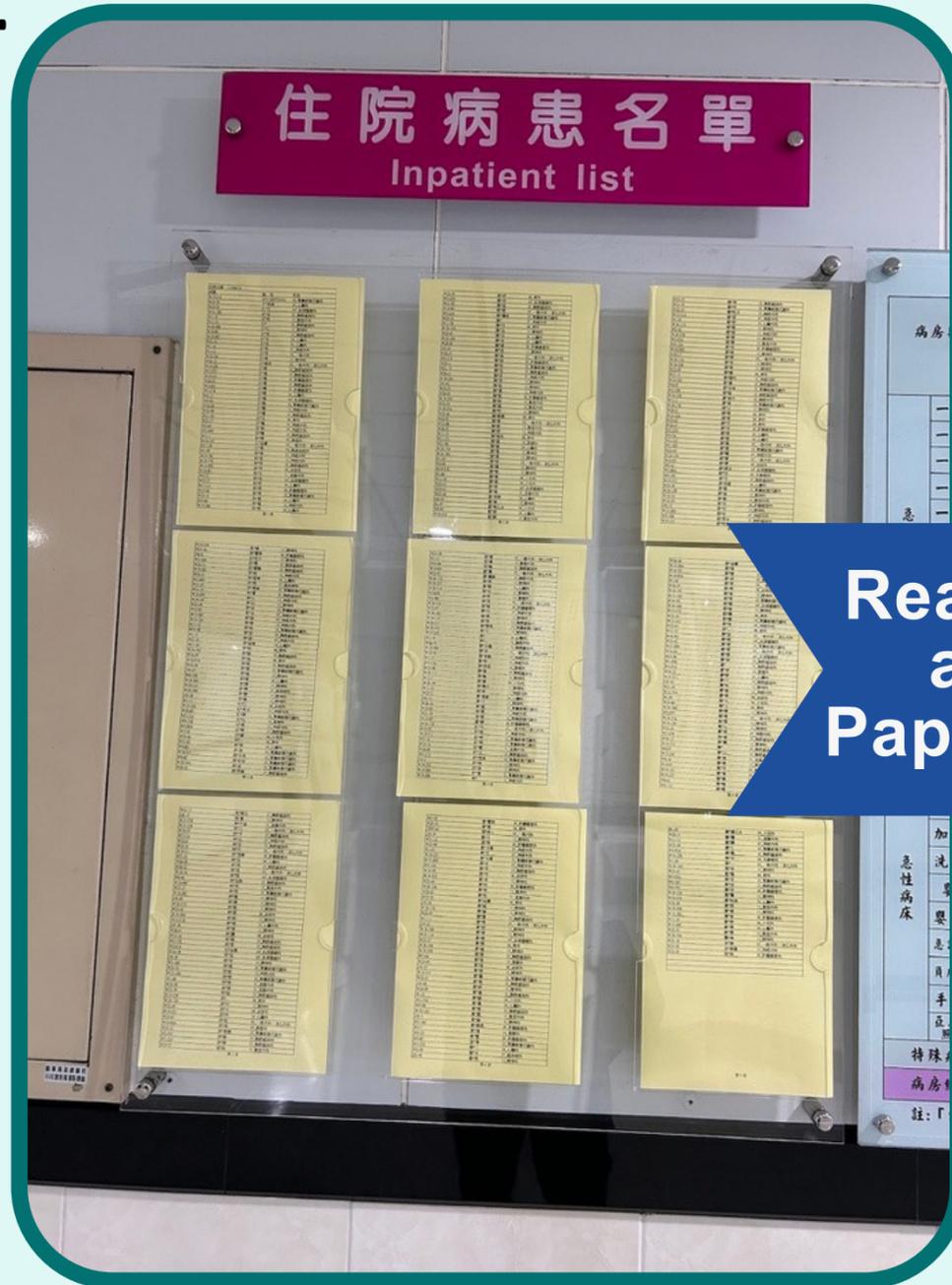
15/31



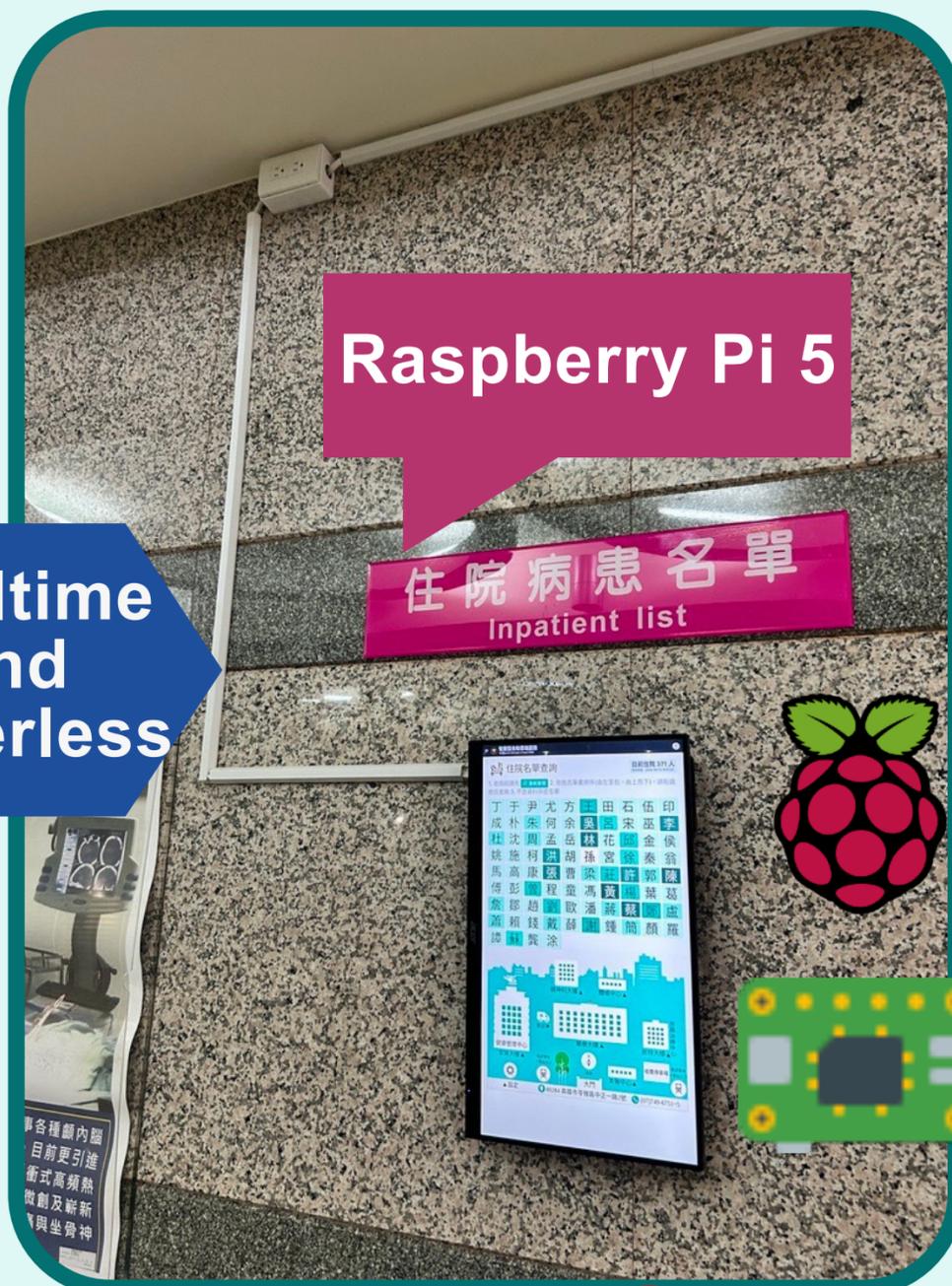


MVP 2

KIOSK INPATIENT LIST RESULT



Realtime and Paperless

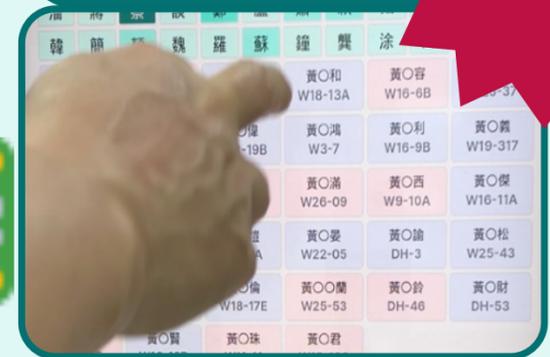


Raspberry Pi 5

inpatient last name list

丁	刁	孔	尤	方	田	石	伍	印
成	朱	江	牟	何	吳	呂	宋	巫
李	杜	沈	汪	狄	卓	周	孟	易
林	花	邱	侯	咪	姚	施	柯	洪
范	章	唐	姬	宮	徐	秦	翁	袁
高	崔	張	曹	梁	莊	許	連	郭
陳	章	傅	彭	曾	程	童	項	馮
黃	塗	楊	葉	資	賈	廖	趙	劉
樂	潘	蔣	蔡	鄭	盧	蕭	賴	龍
薛	謝	瞿	簡	顏	魏	羅	譚	嚴
蘇	顧	龔	樓					

UI/UX



Easy to find

16/31





LINE BOT DEVELOP

MVP 3..N

The screenshot displays a development environment with several components:

- File Explorer:** Shows a project structure with folders like 'controllers', 'helpers', 'jobs', 'mailers', 'models', 'policies', 'services', 'tableau', and 'views'.
- Code Editor:** Shows the code for `messaging_service.rb` within the `Lines` module. The code defines a `MessagingService` class that inherits from `Line::Bot::Client` and implements a `handle_callback` method.
- Git Graph:** Shows a commit history table with columns for Graph, Description, Date, Author, and Commit.

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 '84c94715f0c7eae6f6bb65...	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	f79f2e2f
	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





CUSTOMER DATA PLATFORM DEVELOP

MVP 3..N

registrations_controller.rb × tophbt.rb × _registration.html.erb × idcard_controller.js × Git Graph ×

```

class RegistrationsController < ApplicationController
  skip_before_action :authenticate_user!, only: [:new, :create,
  before_action :set_registration, only: %[show edit update des
  before_action :set_his_patient, only: %[edit]
  # before_action :patient_no_exists?, only: %[edit]

  include Esignable
  include Smsable

  # GET /registrations
  def index
    @q = Registration.ransack(params[:q])
    @q.sorts = 'created_at desc' if @q.sorts.empty?
    @registrations = @q.result.includes(:consent_logs).page(para
    mh_idno = Registration.all.map { |x| x.national_id_no.upcase
    @patient_no = His::Patient.where(mh_idno: mh_idno.reject(&er
  end

  def esg
  end

  def check_id
    # return unless TwidValidator.valid?(params[:idno]) && !para
    # unless TwidValidator.valid?(params[:idno])
    # redirect_to check_id_registrations_url, notice: "身份證號
    # return
    # end
    his_patient = His::Patient.find_by(mh_idno: params[:idno].up
    if his_patient.present?
      respond_to do |format|
        format.html
        format.turbo_stream { render turbo_stream: turbo_stream.
      end
    else
      respond_to do |format|
        format.turbo_stream { render turbo_stream: turbo_stream.
        format.html
      end
    end
  end
end

```

Graph	Description	Date	Author	Co
	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	ca9l
	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	31 May 20...	nickle	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

免費健康檢查 *精美宣導品 數量有限 送完為止

主辦單位: 國軍高雄總醫院
 協辦單位: 海光里 摩國話里長
 檢查日期: 113年3月5日(星期二) 上午 08:00-11:00
 檢查地點: 新海光里社區發展協會
 高雄市鳳山區海光里勝利路22號

*需抽血檢查請空腹8小時 *請攜帶健保卡、身分證
 55歲以上(58年次含以前)原住民請攜帶戶口名簿

設籍於高雄市, 免費 65歲以上老人健康檢查項目

老人健檢
 *迷你營養評估(MNA)*老年憂鬱量表
 *尿流檢查(蛋白質)
 *抽血檢查: 腎功能、血脂肪、血糖、甲狀腺刺激素
 *胸片X光*心電圖*牙齒檢查

免費 40-64 歲(非設籍於高雄市) 65歲以上老人健康檢查項目

成人健檢
 *身體檢查、尿液、視力檢查、腎功能、血脂
 防 (膽固醇、三酸甘油脂、高密度脂蛋白
 膽固醇)、血糖...等

B/C 肝炎篩檢
 *B/C 肝炎篩檢 (45-79 歲、40-79 歲原住民)
 轉身一次免費

我要預約「測試」鳳山區新海光社區

請直接輸入您的預約基本資料, 或可以上傳身分證正面由系統 AI 自動辨識, 您上傳的證件圖片, 僅作為此次體檢資料自動識別之用

姓名: 身分證統一編號:

出生年月日: 性別:

1974/11/06 無

聯絡電話: 教育程度:

住址:

請上傳您的身分證正面照片或由上方輸入基本資料(非必要)

請上傳 身分證正面 請上傳 身分證背面



18/31

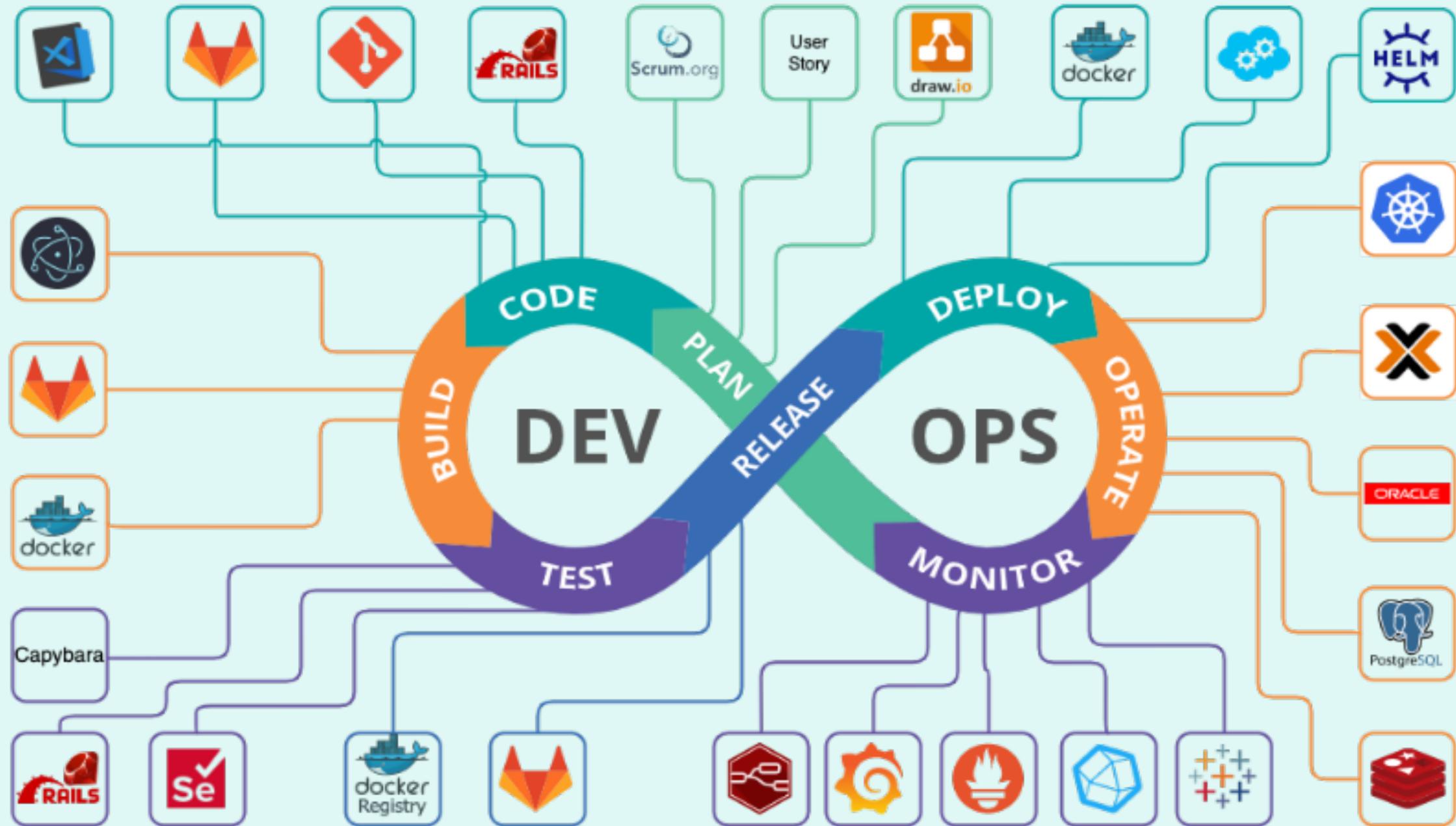


3. Big Platform INTEGRATION





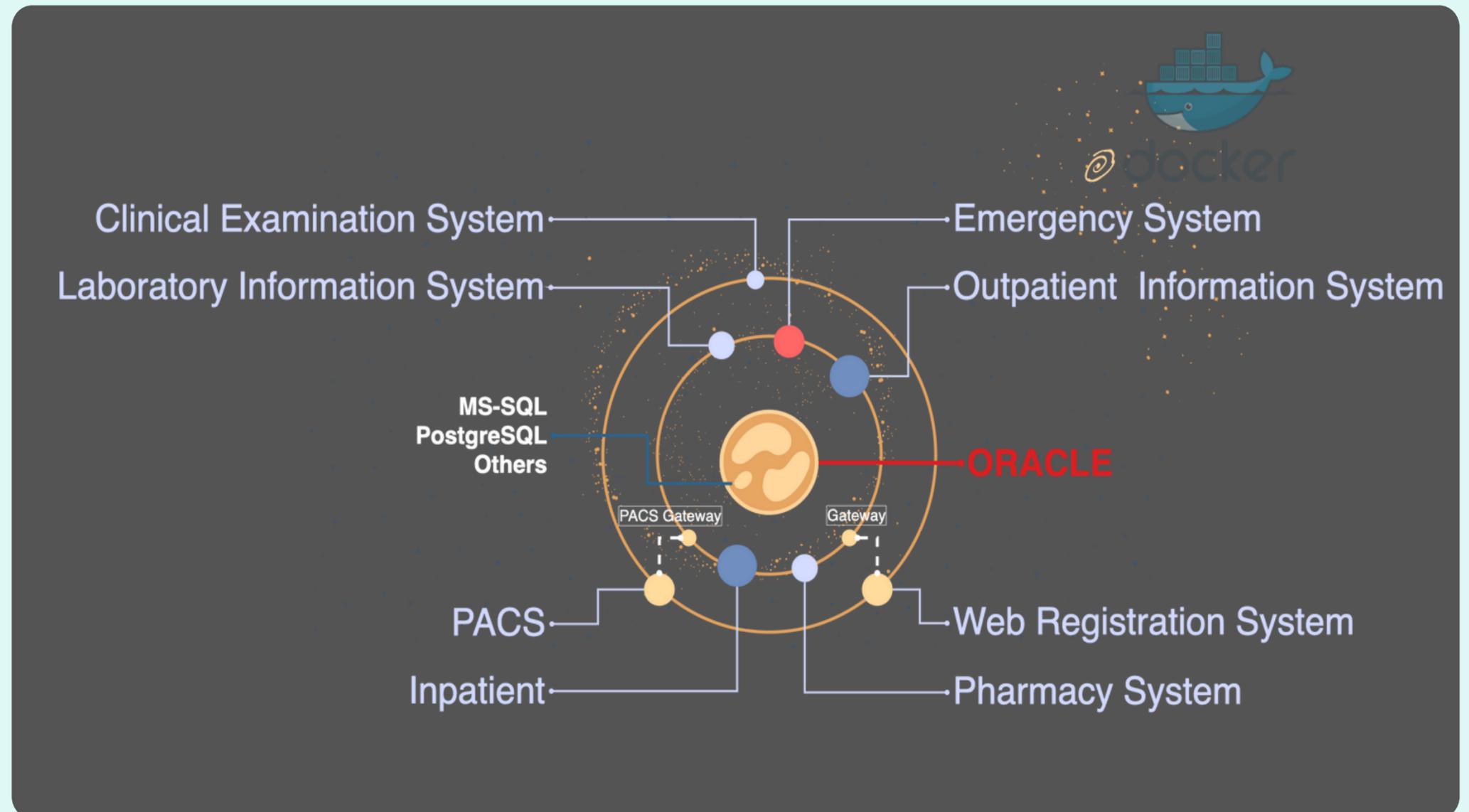
MORE AND MORE MVPS AND SOFTWARE NEED TO INTEGRATION





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

The application name or URL or description contains

Website link + search

(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 ...

Forgot password and avatar
my profile
my certificate
my password
Synchronize HR account
Sign out

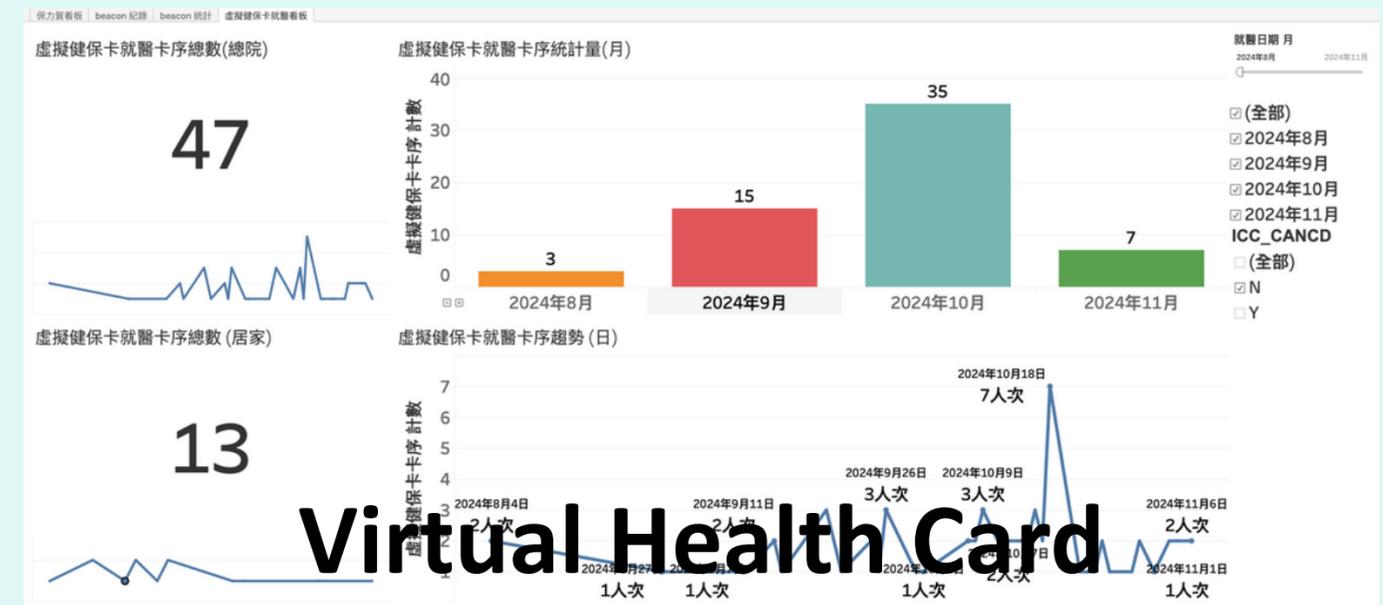
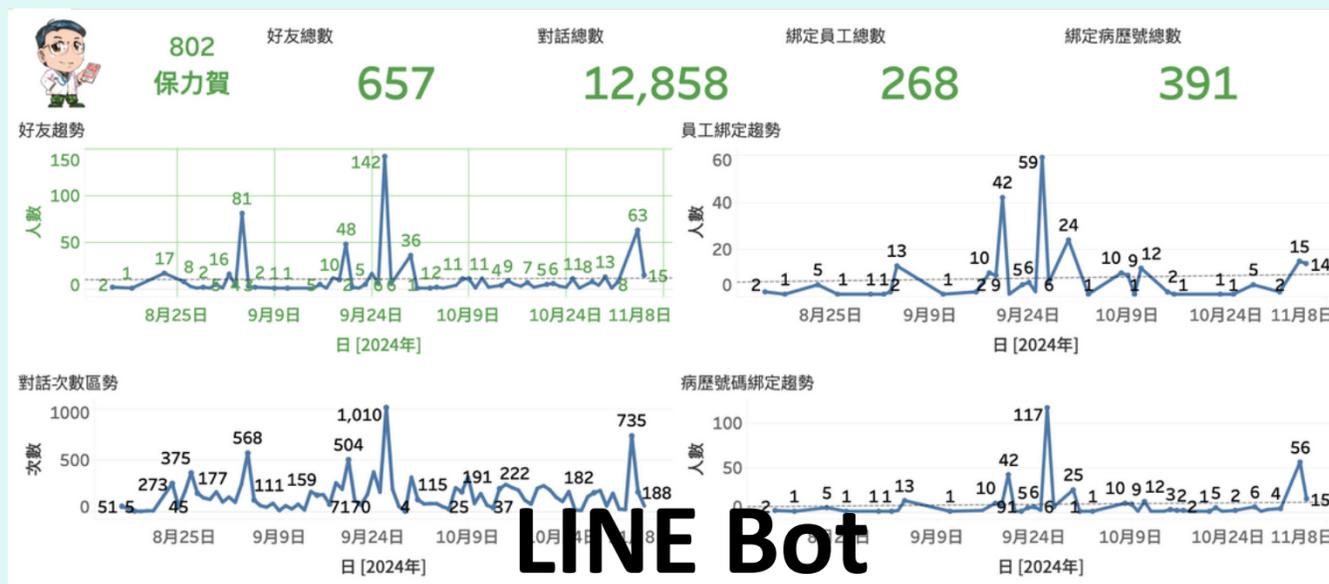
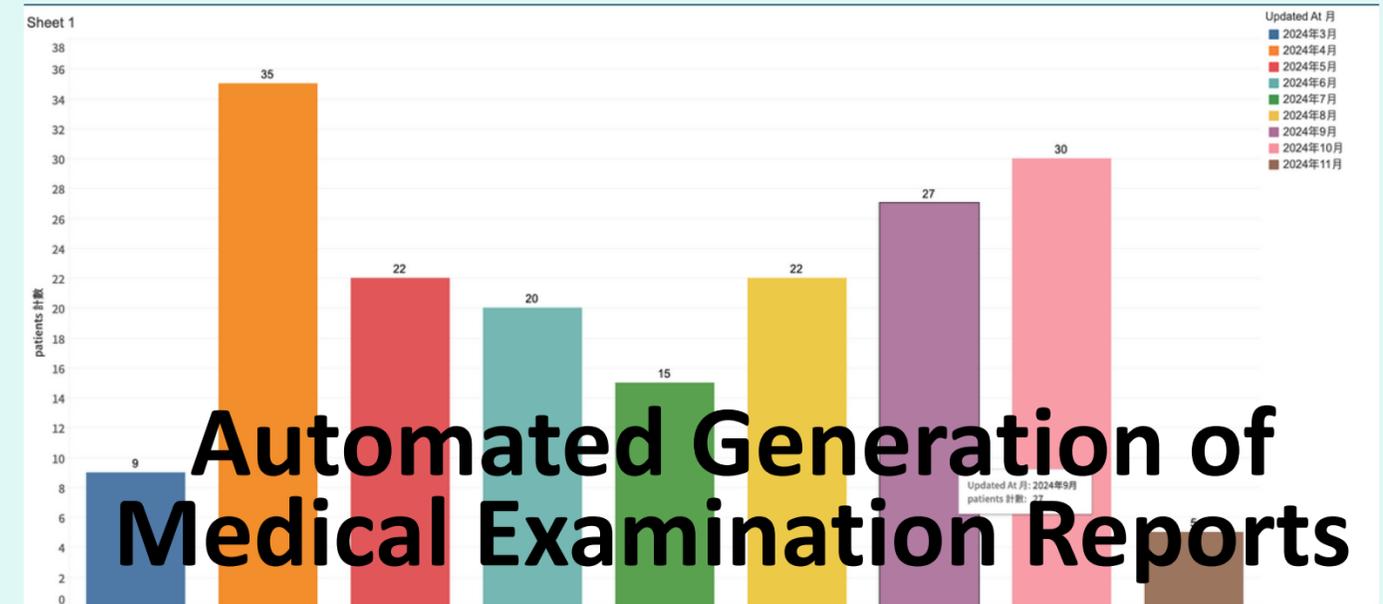
show all 24 apps

國軍高雄總醫院
Healthcare Cloud





MPV BI (TABLEAU_API GEM)





DIGITAL HEALTHCARE PLATFORM

SMART on FHIR

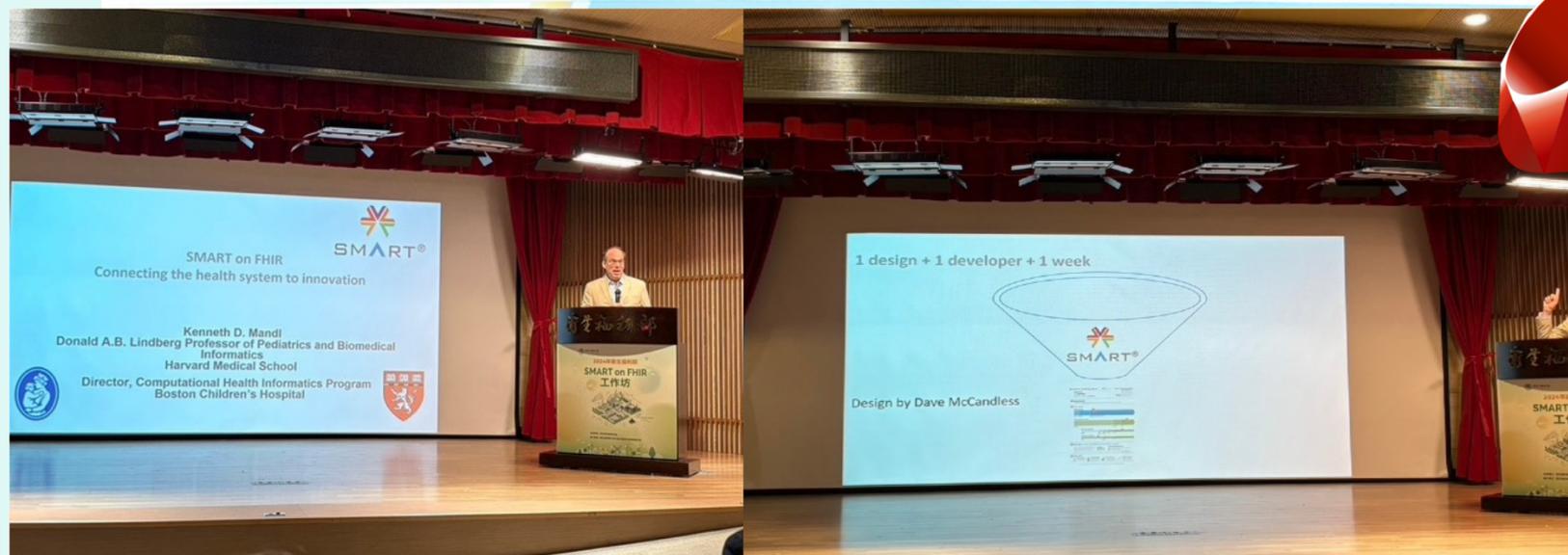


SMART (Substitutable Medical Apps, Reusable Technologies)

"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



November 8, 2024 – Ministry of Health and Welfare, Taiwan

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DIGITAL HEALTHCARE PLATFORM

Ministry of Healthcare and Welfare, Taiwan

SMART on FHIR Ruby Gem

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

Software Libraries for Developers

- HTML5
- Apple
- Python
- Microsoft .NET
- Red Hat
- Java

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，而毋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。

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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 THEN 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



THANK YOU FOR LISTENING. ANY QUESTIONS?



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