

HAZRIEN BIN NAZMAN

Embedded & IoT Engineer

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PROFILE

Embedded and IoT engineer with **5 years of experience** building connected systems end-to-end, from **ESP32 firmware (ESP-IDF, C)** and **PCB design** to **MQTT infrastructure** and **Node.js backends**. **Currently the lead developer and product owner** of an IoT platform running 300+ unattended machines for 20+ clients. Comfortable with hardware bring-up, protocol integration (RS232, pulse I/O, USB, MQTT), cloud backends and the field support that follows deployment.

WORK EXPERIENCE

Product Manager & IoT/Backend Developer 01/2025 – present | Kelana Jaya, Selangor
T05 Technologies Sdn Bhd 🌐

- Led firmware, backend, and frontend development for NebulaMQTT V2, an ESP32-S3 controller (ESP-IDF) with 2× pulse outputs, 1× pulse input, and 2× RS232 ports.
- Built RS232 integration that lets vending machines log cash payments and accept QR payments, a client-requested feature.
- Product owner of the Nebula IoT Management System (NIoTMS), which manages 300+ field devices for 20+ clients.
- Own and maintain five products: NebulaMQTT, NebulaMQTT V2, Yallvend, T05 Helmet Washer and Synapse Coin SIM.
- Led backend development for T05 Helmet Washer and the Membership Allocation Redemption System (MARS).
- Built backend gateway integrations (UQPAY, Coins.ph, Safaricom) for <https://payralllel.io/> 🌐, a payment orchestration platform serving 373 merchants and 2,760 terminals across 15 gateways (Node.js, MongoDB, DigitalOcean).

IoT Developer & Node.js Backend Engineer, *T05 Technologies Sdn Bhd* 02/2023 – 12/2024 | Kelana Jaya, Selangor

- Led R&D on NebulaMQTT firmware, improving device connectivity and performance by 30%.
- Designed the NebulaMQTT PCB, cutting production cost by 20% and improving device reliability.
- Built a Node.js MQTT client and deployed a private, containerised MQTT broker (Docker) for secure device communication.
- Architected device integration for NIoTMS and built its backend API.
- Built the backend of the 1SEA super app (Node.js, MongoDB; Android and iOS), including authentication and data-protection features.
- Provided technical support for deployed IoT products, resolving 95% of issues within 24 hours.

IoT Trainer and Technical IoT Developer 09/2021 – 01/2023 | Shah Alam, Selangor
Myinvent Technologies Sdn Bhd 🌐

- Designed and delivered IoT training courses for 100+ students; mentored 50+ students with a 90% post-course satisfaction rate.
- Created course materials, exercises and assessments that raised completion rates by 20%.
- Worked with clients on custom IoT solutions; built backends and dashboards in Python and Node.js.

FREELANCE & CONSULTING

IoT Firmware Consultant, *Gadang Works Sdn. Bhd* 11/2024 – 02/2025

- Consulted on firmware for an indoor air quality (IAQ) monitor built on ESP32 (ESP-IDF).
- Integrated a 5-sensor array measuring CO₂, temperature, humidity, PM2.5 and formaldehyde (HCHO).
- Built the alerting and data pipeline with Node-RED, a Telegram bot for notifications, and Google Sheets for data logging.

IoT Project Mentor, *SM Sains Kuala Selangor* 01/2023 – 11/2023

- Mentored a team of 5 students building FLORIMS 🌐 (https://ipitex.nrct.go.th/index.php/international/project_detail/0608000879 🌐), an ESP32-based flash flood and rainfall intensity monitor that alerts users through a Telegram bot when rainfall reaches dangerous levels.
- Guided development with Arduino IDE, Node-RED and Telegram bot integration.
- The team won a **Silver Medal at IPITex 2024** (Thailand Inventors' Day), competing against degree, master's and PhD entrants.

PROJECTS

- Nebula IoT Management System (NIoTMS) - <https://nebula.payrallel.io/>** 04/2023 – Present
Product Owner and Lead Developer for Hardware, Firmware, Backend and Frontend
Turns unattended machines into connected devices with payment and sales tracking. Node.js, Express and MQTT for real-time monitoring and remote management of 300+ machines.
- Payrallel - <https://payrallel.io/> @ , Backend Developer** 03/2025 – Present
Payment orchestration platform serving 373 merchants and 2,760 payment terminals, with 15 payment gateways and up to 37 payment methods. Backend developer (MERN stack, DigitalOcean App Platform); integrated the UQPAY, Coins.ph and Safaricom gateways.
- 1SEA MARS - <https://mars.payrallel.io/>, Lead Backend Developer** 10/2024 – 01/2025
Lets merchants issue vouchers and points that customers redeem on T05Pay-powered and Payrallel-powered vending machines, including Nebula devices

PERSONAL PROJECTS

- ESP32-P4 Desk Companion, ESP32-P4 + ESP32-C6, built-in display** 05/2026
- Multi-mode desk device: media remote for Nuvio Desktop, Stream Deck-style PC shortcut pad, Aniimo dex, and a live Palworld minimap.
 - Dual-chip design: ESP32-P4 runs the display and application logic; ESP32-C6 handles Wi-Fi and BLE.
 - Talks to the PC over USB serial through the P4's OTG port; Python bridge scripts act as the API between the device and Nuvio Desktop for playback control.
 - Python service extracts player map positions from Palworld in real time to drive the on-device minimap.
 - 32 GB SD card holds JSON configs and assets (images, map data, shortcut definitions), so content updates need no reflash.
- Self-Hosted Homelab, Proxmox** 2024
- Two-node Proxmox cluster on mini PCs, connected over Tailscale VPN.
 - Runs Jellyfin (media), Home Assistant (home automation), OpenMediaVault (NAS) and Nextcloud.
- Raspberry Pi Pico Macro Keypad, KiCad, Raspberry Pi Pico** 2021
- Designed a 3×3 macro keypad on Raspberry Pi Pico with 4 toggle switches for switching modes; schematic and PCB laid out in KiCad.

SKILLS

- **Embedded:** C, C++, ESP-IDF, FreeRTOS, ESP32 / ESP32-S3 / ESP32-P4 / ESP32-C6, Raspberry Pi Pico, nRF52840, Arduino
- **Interfaces & protocols:** UART / RS232, USB OTG (serial), pulse I/O, SD card storage, Wi-Fi, BLE, MQTT, TCP/IP, HTTP
- **Hardware:** PCB design (KiCad), sensors and actuators, prototyping
- **Backend & cloud:** Node.js, Express, MongoDB, EMQX, Docker, Python, DigitalOcean, AWS IoT Core, Node-RED
- **Frontend:** React, Next.js
- **Infrastructure:** Linux, Proxmox, Tailscale, Git
- **Currently learning:** Rust (embedded, for ESP32-P4 GUI development)

EDUCATION

- Bachelor of Engineering (Hons) Electronic Engineering** 09/2017 – 07/2020 | Shah Alam, Malaysia
Universiti Teknologi MARA
- Diploma in Electrical Engineering (Electronic), Universiti Teknologi MARA** 07/2014 – 09/2016 | Dungun, Malaysia

CERTIFICATES

- Test-first - Drive Clean Code with Automated Unit Tests:** Udemy, Sep 2024
- Crash Course Electronics and PCB Design:** Udemy, Mar 2023
- MyReskills IoT Program: Agriculture and Farming Industrial Revolution (I.R 4.0)**
- Network Security & Database Vulnerabilities:** IBM, Oct 2020

REFERENCES

- Cayrin Ngo Xing Yee, HR,** T05 Technologies Sdn Bhd
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- Nelson Goh Seng Yip, Technical Lead Developer,** T05 Technologies Sdn Bhd
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