NGUYEN DINH PHU (TONY NGUYEN)
Back-end Engineer
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SUMMARY

Systems-minded Back-end Engineer with 5 years of experience architecting high-performance distributed systems, declarative domain-specific frameworks, and low-latency data pipelines within the JVM (Java/Scala) and Go ecosystems. Deeply committed to software craftsmanship and software verification principles; expert in eliminating structural fragility by designing strict error boundaries, clean separation of concerns, and automated test enforcement. A technical problem solver and key technical advisor within the engineering team who commands low-level Linux kernel I/O paradigms, Security-by-Design principles and Threat Modeling, and enterprise-grade core CDP architectures to deliver resilient, production-grade products.

TECHNICAL SKILLS

Programming Languages: Java, Scala, Go, SQL, Bash.
Concurrency & I/O Systems: Virtual Threads (Java 21), Goroutines (Go), Reactive Programming, Non-blocking I/O Core (epoll, io_uring), Backpressure Mechanics, CPU vs I/O-bound Tuning.
Data, Messaging & Pooling: Kafka, RabbitMQ, Postgres, Redis, High-throughput Database Connection Pooling, Distributed Transaction/Connection Lock Management.
Infrastructure, Network & Security: K8s, Docker, Linux Telemetry, Threat Modeling (STRIDE), Zero Trust Architecture, Enterprise Cryptography (PKI, KDF, OAuth2/OIDC) Advanced Networking, Distributed Mesh VPNs, P2P Technologies & UDP Hole Punching (STUN/TURN/ICE), TCP-over-HTTP Tunneling.
Verification & Practices: Formal Verification Principles, SOLID, Clean Architecture.
Architectural Paradigms: End-to-End CDP Architecture (Identity Resolution & Unification), Directed Acyclic Graph (DAG) Processing, Distributed Workflow Orchestration, Stateful Stream Processing, Declarative DSL Engines, Platform SDK Engineering.

PROFESSIONAL EXPERIENCE

FPT Corporation – Back-end Software Engineer **09/2023 – Now**
Project: Customer Experience Platform (CDP & Omni-channel Campaign Engine)

- **Description:** A high-throughput software solution that centralizes heavy customer data interactions into a single unified profile. The system orchestrates real-time cross-channel marketing personalization and processes tens of millions of events per campaign through dynamic segmentation trees.
- **Technologies:** Java, Scala, Go, PostgreSQL, Kafka, Redis, Docker, K8s, GitLab CI.
- **Key Contributions:**
    - **Architected the core end to end CDP Data Pipeline:** Designed the master blueprint for the enterprise data infrastructure: Data Ingress,

Dynamic Mapping Policy, Identity Resolution, Customer Unification, Segmentation, Destinations.

- **Engineered Schema-Agnostic Ingress & Pluggable Destinations:** Implemented highly flexible Data Ingress and Destination gateway layers driven by runtime Mapping Policies, enabling seamless, dynamic source connections and external delivery channel integration without codebase changes.
- **Designed Identity Resolution & Customer Unification Core:** Built the identity stitching subsystem that ingests disparate raw multi-channel data, resolves identity conflicts at scale, and synthesizes fragments into a normalized, singled unified view of the customer (Customer Unification).
- **Architected a DAG-based Streaming Rule Engine via Declarative DSL:** Designed and built a Domain Specific Language (DSL) to model complex campaign branching logic as a Directed Acyclic Graph (DAG), resolving highly complex nested segmentation configurations into an abstract execution tree.
- **Engineered Polymorphic Streaming Nodes:** Implemented a partition-aware Kafka streaming pipeline supporting multi-mode runtime evaluations: Property-based predicate filtering, deterministic hash-based Percentage Distribution, and stateful Quota-based Allocation.
- **Designed Stateful Order-Priority Allocation:** Developed an asynchronous stateful processing mechanism using Redis as a State Store to manage absolute limit branches, guaranteeing strict sequential quota fulfillment and preventing race conditions in high-concurrency event streams.
- **Architected a Modular Platform Web SDK:** Unified fragmented standalone clients into a single, cohesive Web SDK, engineered a dynamic module loading architecture allowing seamless client-side configuration adjustments and backward-compatible hot-fixes without requiring clients to re-embed the code script.
- **Spearheaded Cross-Functional Infrastructure Consulting:** Collaborated actively with DevOps and Infrastructure teams as a technical advisor, analyzed runtime cluster behaviors to propose alternative infrastructure blueprints, successfully eliminating deployment blockers and realigning cluster orchestration with product objectives.
- **Resolved Deep-System Ambiguities and Technical Bottlenecks:** Served as the technical point of contact and advisor for the engineering team, unblocked team execution by troubleshooting deep system anomalies regarding CPU/Thread optimization, async backpressure mechanics, and high-level architectural patterns.
- **Instituted Security by Design via Thread Modeling:** Pioneered proactive system security by conducting comprehensive Thread Modeling using the STRIDE methodology during the early architectural design phase, systematically mitigating spoofing, tampering, and information disclosure risks across distributed microservices.
- **Re-engineered Enterprise Auth & Cryptographic Security:** Overhauled the platform's identity infrastructure by replacing static constant API keys

with a secure KDF storage layer, unified machine to machine API authentication with user to machine OIDC/OAuth2 verification to enforce a consistent, highly compatible cross-subsystem authorization engine.
    - **Optimized Legacy Reactive Runtimes via Virtual Threads:** Modernized a legacy reactive Scala 2 codebase built on Akka HTTP and Slick by engineering a custom ExecutionContext backed by Java Virtual Threads, completely eliminated thread starvation bugs caused by unisolated blocking I/O calls and poorly enforced reactive boundaries from legacy code.
    - **Architected a Resilient Workflow Orchestration Engine:** Replaced an architectural mismatch built on top of Apache Airflow (which suffered from 1-minute execution latencies and job drops under real-time scheduling), reduced campaign trigger latency to milliseconds, eliminated job-drop risks, and enabled bulk event registration within seconds.
    - **Transformed Campaign Processing into Distributed Workflows:** Converted the core campaign processing model from primitive synchronous execution into a fault-tolerant distributed workflow, successfully orchestrating state synchronization, remote transactions, and error recovery patterns across multiple independent microservices.
    - **Optimized Connection Topology & System Boundaries:** Hardened database connection pool configurations and eliminated application-level performance degradation caused by long-lived transactional locks holding active database connections under micro-load.
    - **Hardened Infrastructure Resilience & Quality Controls:** Formulated strict Error Handling Patterns (Error translation at subsystem boundaries) and automated multi-module test aggregation pipelines aligned with software verification standards. Protected production clusters from OOM failures by fine-tuning k8s liveness/readiness probes and container memory constraints.

International Distribution Corporation – Back-end Developer 03/2022 – 02/2023

Project: Unified Multi-Channel Contact Center

- **Description:** A centralized platform handling multi-channel customer interactions (voice, email, chat, social media) to improve enterprise service efficiency and personalization.
- **Technologies:** Java (Spring Boot), MySQL, RabbitMQ, NGINX, Linux, Bash, Custom Network Tooling.
- **Key Contributions:**
    - **Engineered Custom Bi-directional Reverse Tunneling & Proxies:** Designed and implemented a TCP-over-HTTP reverse proxy utility to bypass complex firewall and corporate network boundaries, unblocked engineering operations when native SSH tunneling or corporate VPN access collapsed.
    - **Optimized Engineering Velocity via Network Workarounds:** Merged local port forwarding and proxy routing to safely bridge desktop development utilities into locked-down staging environments, and

bypassed 3rd-party IP whitelisting bottlenecks to achieve full end-to-end integration testing during dev phases.
    - **Collaborated on Cross-Functional Roadmaps:** Collaborated with stakeholders to define product roadmap and deliver features aligned with business requirements.
    - **Designed Core Back-end Service Modules:** Designed and developed back-end services alongside some front-end modules.
    - **Architected Internal Automation Infrastructure:** Architected and built internal automation tools to streamline environment setups and operations, boosting team productivity and velocity.
    - **Standardized Coding Conventions & Workflows:** Defined development workflows and mentored new team members on SOLID principles and Clean Code methodologies.
    - **Maintained High-Availability Production Systems:** Deployed and maintained production systems, ensuring HA, reliability and smooth rolling updates.

NMT Tech – IT Specialist **04/2021 – 03/2022**

- **Key Contributions:**
    - Built a multi-node personal infrastructure laboratory to experiment with and simulate high-availability networking, evaluated Hub and Spoke, Mesh VPN topologies along with custom P2P connections utilizing UDP hole punching (STUN/TURN/ICE).
    - Developed and maintained internal tools to support business operations.
    - Implemented industrial communication bridge solutions utilizing low-level PLC protocol handlers for remote equipment telemetry setup, real-time control, and infrastructure monitoring.

EDUCATION

Ho Chi Minh City University of Technology and Education **2018 – 2022**

- B.S. in Software Engineering.
- GPA: 79.4% (Distinction)

ACTIVITIES

- **Technical Writing & Thought Leadership:** Maintainer and Author of dinhphu28.com, documenting engineering journeys through deep-tech articles on architectural fragility, pragmatic error boundaries, and OS-level memory management and various complex software engineering paradigms.
- **Personal Infrastructure Laboratory:** Designed and maintain a personal, bare-metal multi-node server cluster used as a playground for sandboxing high-availability distributed components, exploring low-level Linux kernel networking, and prototyping complex infrastructure workarounds for day-to-day enterprise delivery.
- **Open Source & Software Craftsmanship:** Active advocate for cli automation and defensive programming, heavily inspired by software craftsmanship standards and robust system philosophies.