Johan Yim

Software Engineer

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Experience

2024-05 Present
Software Engineer BG Automotive

- Developed, deployed and maintained 10 containerized cloud applications optimized for resource efficiency, achieving reliable simultaneous operation on a single-core, low-tier cloud instance consuming less than 2 GB of memory running in parallel.
- Streamlined user experience by implementing stateless, secure authentication using `JWT`s stored in HTTP-only cookies, with access and refresh token rotation for session management.
- Implemented HTTP middleware in `Rust` using `Redis` as an intermediary write-back cache layer, Server-Sent Events, and client-side Virtualization/Windowing to handle payloads 600 times larger.
- Developed a `daemon` process that monitors key presses and recognizes barcode syntax, triggering image capture from the warehouse CCTV system to be used as customer-facing proof of order integrity, saving over £150,000 worth of reimbursements.
- Implemented semaphore-based synchronization in an asynchronous, multithreaded environment, to prevent race conditions and manage concurrent write operations.
- Used `cron`, the `GNU` coreutils, and `git` to create an automated deployment pipeline for various automated services.
- Migrated from and interoperated with legacy C# interfaces - originally created in 2003 - to modern Rust-based desktop applications, web APIs and scheduled automations.
- Implemented procedural compile-time macros to enhance developer experience through abstraction, reducing the source lines of code in the overall project by 42%.
- Interfaced with the `xlsxwriter` C library to programmatically generate non-trivial excel spreadsheets, such as spawning charts and extracting/including VBA macros at compile time.

2024-03 2024-05
Volunteer Data Assistant Bath Royal Literary and Scientific Institution

- Used text-manipulation tools from the `GNU` coreutils such as `awk` and `sed` to process and clean existing tabular data.

Projects

Structure-Preserving Encryption and Decryption johanyim/spead

- Used the `perf` utility to inspect call graphs, identifying and reducing the impact of performance bottlenecks.
- Compiled Rust to WebAssembly `(WASM)` to execute performance-critical logic on the client-side, reducing pressure on backend services while delivering a responsive user experience.
- Implemented key derivation with the `Argon2` algorithm to derive cryptographically strong keys to mitigate brute-force and GPU-based attacks.
- Applied Format-Preserving Encryption (FPE) to encrypt and decrypt structured data without altering data formats or types, reducing the effect of encryption on data type validation.
- Combined concepts from JSON traversal/pointers with nonce selection to produce non-deterministic encryption, resisting ciphertext-equality attacks.
- Built a fully automated, lightweight `AWS` deployment pipeline from scratch using custom `git` hooks and rudimentary `Linux` utilities such as `rsync`, `openssl`, and the `GNU` coreutils.
- Configured `nginx` as a reverse proxy to distribute requests to multiple services.

Education

2019-09 2023-05
Computer Science MComp (Hons) University of Bath

Degree Class awarded: 2:1 - Functional Programming (82%) - Machine Learning (77%) - Statistics for Data Science (73%) - Cryptography (78%) - Data Structures and Algorithms (82%) - Computer Systems Architecture (82%)

2017-09 2019-05
International Baccalaureate (iB) King George V School

39 points overall - HL Maths (7) - HL Physics (7) - HL Computing (5)