

# Gobind Preet Singh

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## PROJECTS

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### **Employee Manager** | *React, TypeScript, Node.js, Express, PostgreSQL, Kotlin, Jetpack Compose* [Github](#)

- Built a full-stack employee management system with JWT authentication, role-based access control, and a shared backend consumed by both a React employer dashboard and an Android client.
- Built a React + TypeScript employer dashboard for employee management, task assignment, and attendance review against a shared backend API.
- Developed Express REST APIs for authentication, employee management, task tracking, and attendance, with server-side authorization, validation, and audit logging.
- Added geofenced attendance verification by validating submitted GPS coordinates and accuracy against a configured work location before recording attendance.
- Designed PostgreSQL tables and constraints for users, tasks, attendance, and audit logs, including one-attendance-per-day enforcement and traceable security event logging.

### **Cloud Inventory Parser** | *AWS, Terraform, S3, Lambda, ECS Fargate, DynamoDB, Python* [Github](#)

- Built an AWS-based invoice ingestion pipeline that converts uploaded PDF invoices into proposed inventory deltas through a controlled parse-then-apply workflow.
- Implemented direct-to-S3 uploads with presigned URLs so large files bypass the API layer instead of being proxied through the backend.
- Offloaded parsing to isolated ECS Fargate tasks and separated inventory mutation from parsing so changes require explicit review before apply.
- Implemented idempotent inventory apply logic using DynamoDB transactions and an apply-ledger table to prevent duplicate mutations.
- Provisioned the cloud stack with Terraform, including API Gateway, Lambda container deployment, DynamoDB tables, S3 lifecycle rules, and CloudWatch logging.

### **Access Request System** | *Java, Spring Boot, Spring Security, PostgreSQL, Docker Compose* [Github](#)

- Built a Spring Boot backend for submitting, approving, provisioning, revoking, expiring, and auditing access to internal resources such as VPN, GitLab, and Jira.
- Implemented role-based authorization with Spring Security and JWT for admins, managers, and employees, enforcing request visibility and action rules based on user role and reporting structure.
- Designed service-layer workflow logic for access request state transitions across submitted, approved, rejected, provisioned, revoked, and expired states, with validation and centralized exception handling.
- Managed the PostgreSQL schema with Flyway migrations and modeled core entities including users, resources, access requests, approvals, provisioning events, and audit logs.
- Wrote unit and integration tests using JUnit, Mockito, MockMvc, and Testcontainers to verify authorization behavior, lifecycle workflows, and persistence against PostgreSQL.

### **Homelab Infrastructure** | *Linux, Docker, Ansible, Caddy, Prometheus, Grafana, Seafile, Restic* [Github](#)

- Built a self-hosted infrastructure stack for reverse proxying, monitoring, password management, file storage, and encrypted backups using Docker Compose and Ansible.
- Automated deployment by rendering templates into a separate runtime directory and launching the stack through Ansible, keeping source-controlled config separate from generated state and persistent data.
- Configured Caddy as the single browser-facing entry point for local service routing and documented the separation between browser routing and container-to-container networking.
- Implemented observability with Prometheus, Grafana, node\_exporter, and Uptime Kuma to separate metrics collection from service availability monitoring.
- Added encrypted Restic backups with retention policies, manual restore testing, and disaster recovery runbooks for stateful services such as Vaultwarden and Seafile.

## PUBLICATIONS

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### Performance Analysis of Post-Quantum Cryptography on SmartNIC Hardware IEEE Publication

- Co-authored peer-reviewed IEEE publication benchmarking post-quantum cryptographic algorithms on SmartNIC architectures.
- Developed multithreaded benchmarking tools in C and Python to measure signing and verification throughput under varying workloads.
- Evaluated algorithm throughput across workloads and validated experimental datasets for performance analysis under realistic test conditions.

## PROFESSIONAL EXPERIENCE

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### Junior Software Engineer May 2024 – Aug 2024

*Quest Software Inc* *Halifax, NS*

- Resolved production issues across Kubernetes and AWS deployments, including deployment failures, dashboard defects, and environment-specific runtime problems.
- Improved secret handling by replacing environment-variable based flows with safer mounted-secret patterns and remediated known vulnerabilities in supporting dependencies.
- Developed Angular features with Kendo UI components and added supporting unit tests for frontend behavior.
- Built monitoring dashboards using JavaScript, Azure Data Explorer, and Grafana to visualize request and microservice traffic patterns.

### Junior Software Engineer Sept 2023 – Mar 2024

*Tech Mahindra* *Brampton, ON*

- Developed internal web tools using Angular and Node.js to automate internal operational workflows and reduce repetitive manual steps.
- Implemented browser-based regression checks with Selenium IDE to catch UI issues before release.
- Troubleshot production and user-reported issues, then documented fixes and operational steps for faster repeat resolution.
- Worked with stakeholders to clarify requirements and turn them into internal tooling features and workflow improvements.

### Technical Support Engineer Jan 2023 – Apr 2023

*SolutionInc* *Halifax, NS*

- Diagnosed and resolved DHCP, VLAN, DNS, routing and switching issues across wired and wireless infrastructure in support environments.
- Automated internal workflows using Python and Perl for database tasks and API-driven operations.
- Tested networking hardware of Ruckus, Ubiquiti and Cisco while verifying protocol behavior and configuration under different scenarios.

### Junior Web Engineer May 2021 – Sept 2021

*Qualiti7* *Montreal, QC*

- Developed front-end features from user stories using HTML, CSS, Bootstrap, and JavaScript.
- Built an internal PHP admin panel with MySQL integration for internal data management workflows.
- Designed relational schemas and ER diagrams for employee and customer data models.

## RESEARCH EXPERIENCE

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### Honours Research Student Jan 2024 – May 2025

*Dalhousie University* *Halifax, NS*

- Designed and ran benchmark experiments for post-quantum cryptographic algorithms on SmartNIC hardware under varying workloads.
- Analyzed benchmark data using Python scripts to compare performance across algorithms and test conditions.

### PINet Lab Intern Sept 2023 – Apr 2024

*Dalhousie University* *Halifax, NS*

- Analyzed packet capture data using Python to study traffic behavior and simulate network flow patterns.
- Developed detection logic for pivot attacks based on network behavior patterns.
- Programmed packet-processing pipelines using the P4 language for SmartNIC experimentation.

## MITACS Research Intern

May 2023 – Sept 2023

*Dalhousie University*

*Halifax, NS*

- Contributed to machine learning research for medical diagnosis systems through experimentation, evaluation of TRIAGE variables, and technical reporting.
- Evaluated model performance across datasets and prepared visualizations for research meetings.
- Produced technical reports summarizing experimental findings.

## TEACHING AND ACADEMIC SUPPORT

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### Systems Programming / Operating Systems Teaching Assistant

Sept 2022 – Dec 2024

*Dalhousie University*

*Halifax, NS*

- Assisted large cohorts of students in learning C programming and Unix systems concepts.
- Held office hours to help debug complex programming assignments and systems projects.
- Maintained GitLab-based workflows for assignment distribution, submission, and course support operations.
- Developed Bash and C testing scripts to streamline grading and feedback processes.

### Learning Centre Teaching Assistant

Sept 2022 – Apr 2024

*Dalhousie University*

*Halifax, NS*

- Provided one-on-one tutoring support across multiple computer science courses.
- Assisted students with debugging and troubleshooting programs written in C, Java, Python, PHP, and SQL.
- Demonstrated multitasking by assisting several students across different topics within a single session.

### Study for Success Tutor

Jan 2022 – Apr 2023

*Dalhousie University*

*Halifax, NS*

- Tutored students individually and in groups across introductory computer science and mathematics courses.
- Helped students develop debugging strategies and structured problem-solving approaches.

## SKILLS

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**Languages:** C, Python, SQL, JavaScript, TypeScript, Java, Kotlin, PHP, Perl

**Web:** React, Node.js, Spring Boot, Express.js, HTML5, CSS3, Tailwind CSS, Bootstrap

**Cloud & Infrastructure:** AWS (S3, Lambda, ECS, API Gateway, RDS, DynamoDB), Docker, Docker Compose, Terraform, Kubernetes

**Systems:** Linux/Unix, Bash, Packet Analysis, P4, Computer Networking

**Tools:** Git, Grafana, Jenkins, Selenium, Wireshark, Maven, VirtualBox, Vim

## EDUCATION

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### Dalhousie University

Halifax, NS

*Bachelor of Computer Science*

*Sept 2020 – May 2025*

- CGPA: 4.25 / 4.3
- Sexton Scholars, Dalhousie Renewable Entrance Scholarships, Bruce – Dorothy Rossetti Scholarship Gold Awards

**Certifications:** AWS Certified Solutions Architect - Associate (SAA-C03); Cisco Certified Network Associate (CCNA)

## ACTIVITIES AND COMPETITIONS

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### CyberSci Competition | *Capture the Flag*

Nov 2022

- Represented Dalhousie University in the Atlantic regional cybersecurity competition.
- Placed 5th in the Atlantic region solving cryptography, reverse engineering, and exploitation challenges.

### Atlantic Game Jam

Feb 2022

- Developed a playable game in a 48-hour hackathon with a small team of developers.

### Course Representative

2021 – 2023

- Acted as liaison between students and faculty to communicate course concerns and feedback.