Junet Hossain

R&D Software Engineer (Telecom & Systems)

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Current Role Overview

- R&D engineer working on carrier-grade DWDM and L2 switching systems, focusing on monitoring, telemetry, and HAL-integrated control-plane software in C/C++.
- Work on **DWDM systems**, focusing on **Spectrum Sharing**, performance monitoring, and alarm management for improved network reliability and observability.
- Contribute across the **complete software development lifecycle**, including control-plane development and integration with the **Hardware Abstraction Layer (HAL)**.

Professional Experience

R&D Engineer July 2025 – Present
Tejas Networks Limited, Gurugram

- **Spectrum Sharing – Performance Monitoring (End-to-End Development)**
  Owned and developed the performance monitoring stack for spectrum sharing using Optical Power Monitoring (OPM), covering monitoring architecture, telemetry, and scalability.
  - Implemented **6.25 GHz granularity optical power monitoring** by extending HAL device classes and integrating changes across node daemons.
  - Developed this alongside existing **channel monitoring**, enabling dual modes:
    - Channel Monitoring (configured channel power)
    - Fine-grained spectrum monitoring (full power distribution)

    Ensured **no breakage** and seamless coexistence.
  - Added **North Bound Interface support** to expose spectrum-level power when enabled via configuration.
  - Worked across multiple daemons to ensure **consistent and reliable communication** of power distribution data.
  - Built **alarm handling for multi-tenant spectrum sharing**:
    - Validates tenant power distribution within assigned spectrum
    - Raises alarms on threshold violations
  - Designed and implemented a **custom single-threaded Wheel Timer** to handle periodic monitoring tasks:
    - Distributes workload across time slots to avoid load spikes
    - Handles multiple tenants, interfaces, and OPM ports efficiently
  - Documented the complete design and implementation using **Doxygen**, including custom pages for theoretical and architectural details.
  - Worked on **MIB updates** and collaborated with NMS team (including simulator support) to enable spectrum sharing monitoring.
  - Currently working on **Power Spectral Density (PSD) monitoring** and support for **multi-vendor OPM modules**.
  - Collaborated with hardware teams for **robust HAL integration** and production reliability.
- **TU Monitoring**: Designed and developed monitoring features for carrier-grade DWDM systems, enabling bulk monitoring of up to **500 VC12 Tributary Units**.

R&D Engineer Intern January 2025 – July 2025
Tejas Networks Limited, Bengaluru

- Gained hands-on experience in Ethernet, VLANs, and Layer 2 switching protocols, along with introductory virtual device driver development.
- Automated Layer 2 product testing using scripting and internal test frameworks, reducing manual validation effort.
- Identified and reported critical software bugs in L2 platform features with emphasis on GPON.

Projects

Memory Leak Detector (Mark & Sweep Garbage Collector)
C — Linux — CMake — Git

- Designed a system-level memory leak detection tool for C/C++ applications.
- Implemented a custom memory allocation layer to track object lifecycles and detect unreachable memory.
- Generated detailed runtime logs of leaked objects for debugging and analysis.

Routing Table Manager (RTM)
C — Unix Domain Sockets — Shared Memory — Linux — CMake

- Built a client–server routing table manager supporting dynamic IP route updates.
- Implemented efficient IPC using Unix Domain Sockets and Shared Memory.
- Added DNS resolution and live route updates without service interruption.

Finite State Machine (FSM)
C — POSIX Pthreads — Linux — Makefile

- Architected a generic event-driven FSM framework with deterministic state transitions.
- Designed a tabular state-representation API to simplify debugging and maintainability.
- Applied the FSM to build a robust email validation engine.

Core Technical Skills

Networking & Telecom

- DWDM, Optical Networks, Spectrum Sharing, Optical Power Monitoring (OPM)
- Layer 2 Technologies: Ethernet, VLAN, Policer, Priority Queuing
- Carrier-grade Switching Systems, Control Plane

Systems & Programming

- C, C++, Python, Shell Scripting
- POSIX Pthreads, Multithreading, IPC (Unix Domain Sockets, Shared Memory)
- Makefile, Autotools (autoconf, automake), Git

Platforms & Tools

- Linux, TEJ-NEOS
- GDB, Valgrind
- Doxygen

Education

Bachelor of Technology (B.Tech) in Computer Science 2021 – 2025
Guru Gobind Singh Indraprastha University, New Delhi
CGPA: 9.03 / 10
Relevant Coursework: Data Structures and Algorithms, Operating Systems, Computer Networks, DBMS