Nipun Attri

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Education

National Institute Of Technology Karnataka — Surathkal, Karnataka
Bachelor of Technology in Computer Science and Engineering — *Aug. 2025 – Present*

Experience

Application & Systems Developer — Jan 2026 – Present
IRIS, NITK

- Load tested critical infrastructure with **Grafana k6** for **1,000+ concurrent users**.
- Integrated **Prometheus and Grafana** monitoring to track infrastructure health and performance.
- Built a durable **Logging Pipeline** with **Vector** and **ClickHouse** for centralized log analysis, sustaining **15,000+ logs/sec** (non-critical) and **3,500+ logs/sec** (critical) at under **0.001% error**.
- Built **native Android widgets**, fixed **bugs**, and added **Reachability and Health** checks.

Projects

scx_adaptive: Adaptive CPU Scheduler | *C, eBPF, sched_ext, libbpf, Linux* | GitHub — May 2026

- Built an **adaptive, multi-policy CPU scheduler** on **eBPF** with **FCFS, Round-Robin, and Priority**.
- Wrote a user-space controller that classifies workloads from **CPU telemetry** using **exponential moving averages**.
- Added **hysteresis-gated policy switching** to prevent thrashing on short spikes.
- Benchmarked with **schbench**: adaptive mode cut **p99 wakeup latency 55%** (31 μs vs 69 μs) and **p99 request latency 22%** (12.6 vs 16.3 ms) versus FCFS, with **1.5%–1.8% higher throughput** than all fixed policies.

Edgectl: eBPF/XDP Kernel Firewall | *C, Go, eBPF, XDP, TC, libbpf, Linux Kernel* | GitHub — Aug 2026

- Engineered a **high-throughput eBPF/XDP packet filter** dropping unauthorized traffic early, **bypassing the kernel stack** for minimal CPU overhead.
- Implemented $O(k)$ **IPv4/IPv6 CIDR blocklisting** with BPF **LPM trie maps**, managed in real time via a **Go CLI**.
- Designed **SYN and UDP flood protection** using kernel-side atomic per-IP/subnet rate limiters to mitigate **DDoS attacks**.
- Built **stateful connection tracking** at **TC ingress/egress** with 5-tuple flow inspection and nanosecond-precision timeout garbage collection.

Two-Pass Hack Assembler | *C++, Data Structures, Bitwise Operations, Compilers* | GitHub — Dec 2025

- Developed a **two-pass C++ assembler** translating **Hack assembly (.asm)** to **16-bit machine code (.hack)**, tested on **1,000+ lines**.
- Implemented **symbol resolution** with **O(1) table lookups**, **23 built-in symbols**, and dynamic variable allocation.
- Built custom parsers encoding **28 computation ops, 7 destination flags, and 7 jump conditions**.

IndiaFOSS 6.0 Event Network | *Proxmox, OPNsense, FreeRADIUS, Kea, Unbound, Prometheus, Grafana* Sep 2026

- Deployed a Wi-Fi network of **36 access points** and **7 PoE switches** on a 1 Gbps line, serving **700 attendees, 1000 devices (430+ concurrent)** with zero downtime.
- Built **Prometheus and Grafana dashboards** tracking traffic and infrastructure utilization.

Extracurriculars

WebClub, NITK | *Executive Member, Systems and Security SIG* — Sept 2026 – Present

- Led a **Linux Installation Drive**, installing Linux for **150+ attendees**.
- Presented a lightning talk on non-networking applications of eBPF.

Technical Skills

Languages: C, C++, Dart, Go, Bash
Systems: Linux, eBPF, XDP, sched_ext, libbpf, file systems, operating systems, networking
DevOps & Observability: Proxmox, Docker, Prometheus, Grafana, ClickHouse, Logchef, Vector
Tools: Git, GitHub, Make, clang, gcc, bpftool, just
Frameworks: Flutter, Ruby on Rails