K Shiv Kumar (Shiv)

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Software/Systems Engineer with a strong foundation in networking and low-level systems, combining **1.8 years** of experience in industry with **more than 4 years** of research in programmable data planes (P4 and eBPF) and compiler framework (LLVM). Experienced in C/C++, Python, Linux Networking Stack, Host Networking, Linux Operating System, and Systems programming, with a proven ability to build solutions for real-world systems challenges.

Education

IIT Hyderabad - (NETX Lab) — Kandi, Telangana
MS (Computer Science and Engineering) - (GPA: 7.60) — 2021–2026
Research: *eBPF, P4 and Compilers*

IIIT Naya Raipur — Naya Raipur, Chhattisgarh
MTech (Computer Science and Engineering) - (GPA: 8.78) — 2019–2021

Shri Shankaracharya Engineering College — Bhilai, Chhattisgarh
B.E. (Information Technology) - (74.48%) — 2011–2015

Skills

- C/C++/Python
- eBPF(TC/XDP)
- P4 Language
- LLVM/Clang
- Host/Core Networking
- TCP/IP Stack
- SDN Concepts
- Linux Networking
- Linux Kernel
- Vagrant/VirtualBox
- Docker/Kubernetes
- DevOps Fundamentals
- GitHub
- SQL
- PCAP Analysis
- Tech. Documentation

Projects

"Yaksha-Prashna: Understanding eBPF Bytecode Network Function Behaviour" | **arXiv '2026:** (🔗)
- Developed a system to validate the correctness and interactions of third-party eBPF network function bytecode.
- Applied program analysis to extract functional properties of eBPF network functions from the bytecode.
- **Tools & Frameworks:** C++, STL library, LLVM, eBPF/XDP, Libbpf, Linux kernel, bpftool, bpfman.

"In-Network Probabilistic Monitoring Primitives under the Influence of Adversarial Network Inputs" | **APNET '23:** (🔗)
- Analyzed vulnerabilities of monitoring primitives in programmable data planes against adversarial inputs.
- Demonstrated FlowRadar pollution attacks where a few malicious flows corrupted telemetry data.
- Quantified attack impact, revealing a 99% drop in FlowRadar's accuracy under targeted adversarial conditions.
- **Tools & Frameworks:** Python, Wireshark, MS Excel.

"DBVal: Validating P4 Data Plane Runtime Behaviour" | **SOSR '21:** (🔗)
- Developed DBVal, a runtime validation system to detect packet-processing errors in P4 data planes.
- Implemented assertion-based tracking of tables and actions, enabling line-rate validation of runtime Behaviour.
- **Tools & Frameworks:** Python, P4 language, Lex & Yacc, BMv2, Mininet, Wireshark, VirtualBox.

Professional Experience

Application Development Analyst (*Accenture, Pune, India*) — Mar 2016–Dec 2017
- Integrated a Learning Management System and developed an off-boarding feature for the client's Salesforce environment, enhancing user onboarding and lifecycle workflows.
- **Award:** Apex Award - Extra Miller, in Accenture India.

Certifications

- **Intel Connectivity Academy Level 1** | Issued by: Intel (🔗)

Awards And Honors

- ACM SIGMETRICS Student grant: For presenting our ongoing research on *"Detecting Adversarial Attacks on Bloom Filters in P4 Data Plane Systems"* (2022). (🔗)
- COMSNETS Travel Grant: For attending the Conference (2022). (🔗)