

ABDUL WASEY

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SUMMARY

Network and firmware engineer working across the Linux stack, from secure boot in U-Boot to the network data path in eBPF/XDP. Built xdp-bfd, a BFD engine in XDP, and contribute fixes upstream to FRRouting. I run my own infrastructure and write up what I build at w453y.me.

EDUCATION

National Institute of Technology Karnataka, Surathkal

B.Tech in Metallurgical and Materials Engineering (expected)

Nov 2022 - May 2027

EXPERIENCE

Quantum Networks

Firmware Engineer | U-Boot, Secure Boot, OpenWrt/QSDK, Qualcomm IPQ60xx

Dec 2025 - Present

- Implements **FIT image verification** and **verified boot** in **U-Boot** for OpenWrt-based access points, so the kernel and rootfs are authenticated before Linux starts, across dual-image NOR+NAND layouts.
- Built and maintains the **Qualcomm IPQ60xx secure-boot** workflow end to end: OEM key provisioning, a **QSDK signing pipeline** (RSA-PSS, SHA-384 fuse hashes, signed recovery images) and boot-chain verification from PBL to Linux. Root-causes boot failures with **EDL/Sahara**, **Firehose** and serial tracing.

Tata Communications

Intern | MPTCP, OpenMPTCProuter, OpenWrt, QEMU

May - July 2025

- Researched and deployed **OpenMPTCProuter** (Multipath TCP WAN bonding on OpenWrt) on a two-link wired + cellular site, reaching **230 Mbit/s aggregated** with a dropped link rejoining in **2-4 s**, even after a 90 s outage.
- Built a **QEMU** and network-namespace lab reproducing link flaps, loss and blackholes to test every image, and fixed OMR bugs it exposed, including a rate unit mix-up that **overdrove every link 8x**.

IRIS, NITK

Systems Engineer, then Systems Lead | Proxmox, NGINX, Zabbix

May 2023 - May 2026

- Migrated **40+ containers** and **15+ VMs** from standalone Proxmox and Nutanix hosts onto a high-availability **Proxmox cluster** with **zero downtime**, with containerized backups to NAS and Ceph S3.
- Added **JWT authentication** to internal dashboards through a custom-built NGINX module, and set up **Zabbix** and **Grafana** monitoring with alerts for outages and certificate expiry.

Research Intern, NITK | Supervisor: Prof. Mohit P. Tahlilani

802.1X, NAC, PacketFence, OPNsense

April - July 2024

- Built a **network access control** testbed with **PacketFence** and **OPNsense** on two Proxmox servers and a Cisco switch, with dynamic onboarding across registration, isolation and production VLANs.

PROJECTS

xdp-bfd: BFD engine in eBPF/XDP

Solo project | C, eBPF/XDP, libbpf, FRR

- A **BFD** (RFC 5880/5881/5883) engine with its fast path in **XDP**, so sessions keep their timing when userspace is starved. Runs standalone or as the data plane for an unmodified **FRR bfd**.
- On bare metal, held **1022 sessions with 0 flaps** under real-time load that made stock bfd flap **18,910 times**. 0 flaps at 4096 sessions on **6.2% of a core**.
- Echo, multihop, demand mode, **keyed SHA1 auth inside XDP** and **hitless restart**, shipped as Debian and RPM packages that run without root.

IndiaFOSS 2026 Conference Network

NITK team | 802.1X, FreeRADIUS, OPNsense, Proxmox VE

- Built and ran the Wi-Fi for **712 people on 1,138 devices** over two days: 36 access points, per-person **802.1X** with replicated **FreeRADIUS**, and **OPNsense** with per-device shaping, all on one Proxmox host. Presented it at the event.

IPv6 Campus Deployment, NITK

APNIC-funded | SLAAC, DHCPv6, RADVD

- Dual-stack **IPv6 rollout** across campus VLANs with DHCPv6 snooping and RA filtering against rogue routers, and fixed Android DNS over IPv6 with **RDNSS-only** advertisements.

Self-hosted infrastructure

Solo project | Proxmox VE, OPNsense, NGINX, WireGuard

- Two-node **Proxmox** cluster on shared iSCSI storage running mail, Matrix, DNS and more behind **OPNsense** and one NGINX proxy, with Prometheus monitoring and offsite backups over **WireGuard**.

OPEN SOURCE

FRRouting (FRR)

16 patches merged into bfd | C, Python topotests

- Fixed the **data plane** path found by running xdp-bfd against it: a UNIX-socket transport that never worked, sessions silently lost to a full buffer, and echo negotiation for offloaded sessions.
- Implemented **demand mode** (RFC 5880 §6.6) and fixed **authentication**: a SHA1 replay check that never ran, a silent fallback to no auth, and keys carried to the data plane. Added a **test data plane daemon** and topotests for that path.

Linux kernel (MPTCP)

Queued for 6.12, 6.6 and 6.1 stable | C, kselftest

- Fixed a misapplied stable backport that made servers **refuse MP_JOIN**; reviewed by the MPTCP maintainer. A second fix, for fullmesh subflows that never rejoined, is in review with a selftest.

Ignition / Butane (CoreOS)

Merged | Go

- Reported and fixed Butane accepting non-gzip inline contents marked **compression: gzip**, which passed validation and then **failed at first boot**; it is now caught when the config is built.

ngx-http-auth-jwt-module

Merged in v2.4.0 | NGINX, C

- Made **auth_jwt_enabled** accept variables, so JWT can be turned off per request with **geo/map**, for example for a VPN subnet. Runs in production as the reverse proxy in front of my self-hosted services.

SKILLS

Languages:	C, Python, Bash, Perl
Networking:	BFD, FRR, IPv6, 802.1X/RADIUS, VLANs, WireGuard, MPTCP, OPNsense, tcpdump/Wireshark/scapy
Systems:	eBPF/XDP, libbpf, Linux networking, U-Boot, secure boot, OpenWrt/QSDK, Proxmox VE, ZFS, iSCSI, Docker, NGINX

TALKS

WiFi at IndiaFOSS 6.0: Powered by FOSS

IndiaFOSS 2026, Bengaluru

Securing IPv6 Networks with Firewalls

Workshop on IPv6 Deployment, NITK

Open Source Monitoring in Action

FOSS Meetup 2025

WAN Aggregation using OpenMPTCProuter

FOSS Meetup 2024