Arpit Bhardwaj

proffapt.hashnode.dev
GitHub

proffapt@pm.me
LinkedIn

Mathura, India

Academics

2021-present	B.Tech. in *Industrial & Systems Engineering* - **Indian Institute of Technology, Kharagpur**
CGPA	**8.46**

Experience

Apr '24 Present	**Software Engineering Intern:** AWSMO **Remote**

- Implemented **CI/CD pipelines** using **GitHub Actions** for all services, featuring post-deployment health checks & **rollback on failure**, ensuring ≃40% less downtime & maintaining system integrity across the deployment lifecycle.
- Orchestrated multi-service architecture using **Terraform**, automating infrastructure management & deployment.
- Implemented business logic in **Django Rest Framework**, streamlined ML training, utilized **AWS Batch** for *55%* faster execution, and **AWS CloudFormation**, enhancing overall workflow automation and scalability by over *50%*.
- Developed a custom *stress testing framework* using **Golang**, **Python**, and **Terraform** to simulate various load patterns on servers, improving **testing efficiency by 50%** and identifying **20 critical bottlenecks** across all services.

Awards

- **InterIIT Tech Meet 12.0 | Contingent Gold**
  - Secured overall **first place consecutively for the third time** in the InterIIT Tech Meet 12.0 as a team held by IIT Madras
  - Participated in **3 events** as a developer in the team, working on **backend**, **cloud systems architecture** and **blockchain**
  - Developed novel applications using **Metamask Snaps**; **patched bugs** in aptos library to send requests from browser
  - Implemented **CI/CD** automation for custom-built backends supporting two major events, enabling continuous delivery

Projects

- **ApnaInsti | Golang, AWS, Docker, Nginx**
  - Developed **official mobile app for IIT Kharagpur** centralizing academic data, events & integrating exclusive features
  - Managed deployment on **AWS EC2** with **RDS** & **Docker**, utilizing **CodeDeploy** & **CodePipeline**, scaling for **2000+** users
  - Built features: **travel share** & **buy/sell portal**; led a team developing **Django REST backend** & **React Native frontend**
  - Constructed the **feature roadmap** and oversaw the **system design** and **UI design**, driving the overall technical process
  - Implemented **real-time Score Board** feature for GC using **Go** and **WebSockets**, deployed as micro-services in **Docker**

- **MFTP | Python, Docker, Gmail API, ERP Login Module, Systemd, Cronjob**
  - Developed a service delivering students **real-time placement portal notices**, ensuring no missed critical deadlines
  - Designed to run as a robust **systemd service** or **scheduled cronjob**, monitoring ERP placement portal periodically
  - Integrated with **SMTP**, **Gmail API** & **NTFY** for timely delivery of notification emails **within 1 minute** of post to students
  - Utilised **ERP Login Python Package** to implement login functionality for ERP - where the college placement portal resides
  - Implemented a **health-check** utility to periodically check the logs & notify in case of errors, both deployed via **Docker**

- **Naarad | Golang, Nginx, Digital Ocean, GitHub Actions, Docker**
  - Deployed a customised version of **NTFY** - student run noticeboard service for IIT KGP students - serving **5000+ students**
  - Managed deployment on **Digital Ocean** with **Docker**, utilizing **GitHub Actions** for **CI/CD**, scaling for over **15,000** users
  - Implemented **Heimdall** authentication, **OTP** verification via **institute email**, **JWT** & **NGINX** rules, allowing only KGPians
  - Engineered a **custom user registration system** integrating **JWT** authentication from **Heimdall**, credentials sent to email
  - Maintained a **custom NTFY image** with a **cross repository workflow trigger**, deploying naarad once the image is updated
  - Integrated with **MFTP** serving **Internship and Placement notices** with separate topics for Internship, Placement & PPO

- **On-Premise Server Setup & Management | Proxmox, Nginx, Docker**
  - Configured Proxmox as a **Type-1 Hypervisor**, optimizing resources, and enhancing security, ensuring high availability
  - Implemented a fault-tolerant **3-layer architecture**, efficiently handling DNS requests, microservices, & outgoing traffic
  - Deployed **Nginx** as the single entry point, accepting & forwarding DNS requests to the appropriate dockerized service
  - Efficiently orchestrated and managed multiple VMs running isolated **dockerized microservices**, ensuring **scalability**
  - Implemented a dedicated gateway machine performing **SNAT** for routing and forwarding outbound requests securely
  - Implemented a robust **custom CI/CD pipeline**, managing authentication of requests through **encrypted auth tokens**

- **Metahub | C, Networking, Bash, systemd**
  - Revamped a **PtokaX** based **Direct Connect** (DC) Hub exclusive to IIT Kharagpur, simplifying the configuration process
  - Meticulously identified and **resolved compilation errors**, ensuring a successful build and seamless installation process
  - **Rectified a bug** affecting the ban functionality, resulting into incorrect redirection which improved the server stability
  - Developed a script to **automate the setup, start, and stop processes** of the server, enhancing ease of management
  - Implemented a script to **monitor the status of the server**, ensuring continuous operation and proactive monitoring
  - Successfully established a reliable system startup service using **systemd**, guaranteeing uninterrupted server availability
  - **Handled static IP configuration** when the host device changes locations, improving network stability & accessibility

- **Intelligent Question Paper Search | Golang, Docker, PostgreSQL, GitHub Actions**
    - Co-developed backend in *Golang* for a platform to serve **previous year question papers** for courses offered at IIT KGP
    - Leveraged **PostgreSQL** to implement **vector search** to efficiently provide possible suggestions for requested keywords
    - Implemented **multi-staged builds** in Dockerfile, *reducing the image size* by ≃**85%**, saving **critical 10%** of *storage on server*

- **ERP Login Module | Python, Gmail API**
    - Developed and published the iitkgp-erp-login, **Python package on PyPi**, catalyzing a remarkable surge in user adoption
    - Successfully achieved an outstanding **90%** reduction in login workflow lines, significantly enhancing code conciseness
    - Implemented **OTP support**, using the Gmail-enabled Google API to fetch the latest OTP mail, ensuring seamless login
    - Engineered in such a way that it also **supports web apps** now utilized in various projects like **GYFE**, **GYFT**, and **MFTP**
    - Orchestrated robust **deployment pipelines** to **build** and **publish** the release on GitHub and **Python Package Index**

- **fERP | HTML, CSS, JavaScript, Web Browser Extension, BASH, Nginx, OCR**
    - Published a browser extension **automating feedback form filling** for IIT Kharagpur students, used by **1000+** students
    - Ensured seamless compatibility with **Chromium and Firefox based browsers**, expanding reach to a bigger user base
    - Implemented total **3 feedback modes** - positive, negative and neutral - which ensured diverse feedback representation
    - Enhanced efficiency by **automating the transition** to the next course/professor upon form submission, saving time
    - Implemented a novel algorithm to solve the **CAPTCHA** with above **90%** accuracy written in **BASH**, served using **nginx**
    - Engineered **deployment pipelines** to **build** and **publish** on - **GitHub**, **Mozilla Add-on Store** and **Chrome Web Store**

- **Code Runner | Bash, Vim, VSCode**
    - Developed for Linux & Unix users, streamlining **compilation and execution of code** in various programming languages
    - Provided convenient installation by making the tool readily available on **Homebrew** and **AUR** (Arch User Repository)
    - Implemented Python version detection with an accuracy rate of **90%**, guaranteeing smooth programming experience
    - Integrated **Vim and VS Code keybindings**, optimizing the development flow for seamless programming experience
    - Integrated a **debugging mode**, enabling streamlined troubleshooting for enhanced software developer experience

- **GSYNC | Bash, Linux Uitilities**
    - Developed for automating **real-time synchronization of files and folders** from a local system to GitHub as a **service**
    - Implemented **service functionalities** - *start*, *stop*, *status*, *restart*, *enable*, & *disable*, with innovative *selective-start/stop*
    - Elevated user experience and ease of use through efficient troubleshooting and intuitive **colored logs management**

Positions of Responsibility

- **Technology Coordinator | Technology Students' Gymkhana, IIT Kharagpur**
    - Oversaw **technological advancements** & led a **tech team of 6 developers** at IIT Kharagpur; maintaining multiple projects
    - Assisted in resolving **over 200** student complaints every month, related to internet connectivity throughout the campus
    - Maintained multiple projects : **ApnaInsti** app, Inventory Management System, **TSG website**, Gymkhana Blogs using **Ghost**
    - **TSG Noticeboard**: Central hub for IIT Kharagpur's tech-related announcements, updates, & guidelines, serving the students
    - Developed a **dashboard** for TSG website & ApnaInsti mobile app for dynamic data update and mass certificate generation
    - Acted as **Executive Head of Developers' Society** working with **72+** members promoting development culture on campus

- **Maintainer | Metakgp, IIT Kharagpur**
    - Maintained various critical **open source projects** for student community of IIT Kharagpur, easing out stressful processes
    - These projects include **gyft** - timetable downloader, **kronos** - semester grade distribution, **metawiki** - IIT Kharagpur wikipedia
    - More projects: **gyfe** - exhaustive electives list builder, **wimp** - helps to find a professor based on their compiled schedule
    - Developed comprehensive **CI/CD pipelines**, automating image builds, uploads to **DockerHub**, deployments, & **healthchecks**
    - Maintained all the servers related to above and other projects on **DigitalOcean** and DNS server using **Terraform** on **GitLab**

- **Executive Head, FOSS Club Lead | Kharagpur Open Source Society, IIT Kharagpur**
    - Organised **multiple student workshops**, promoting the adoption of open source and raising awareness among students
    - Organised KWoC-(22 and 23) (**Kharagpur Winter Of Code**) a month long event with **1.2k+ & 2.5k+** participants respectively
    - Developed **automated** workflows for **internal processes**, including **certificate generator** for KWoC and various PORs

Technical Skills

Languages	Golang, Python, Bash, Java, Typescript, JavaScript, C/C++, R, LaTeX, HTML, CSS, Lua
Frameworks	Go-Fiber, Flask, Django, Node.js, Express.js, Hyperledger Fabric
DBMS	PostgreSQL, MongoDB, MySQL
DevOps	Computer Networking, Docker, Nginx, Linux System Administration, Cloudflare, Amazon Web Services (AWS), DigitalOcean (DO), Redis, Jenkins, ArgoCD Terraform, Github Actions
OS Platforms	Linux 5/6 (Debian, Ubuntu, Fedora, NixOS), Unix (FreeBSD, OpenBSD, Solaris-8,9,10 & MacOS X)
Blockchain	Metamask Snaps, Hyperledger Fabric, Solidity
Others	Git, GitHub, GitLab, Proxmox, Backend Development Methodologies, Web Browser Extension Development, Penetration Testing (Cyber Security), Object Oriented Programming, Gurobi and CPLEX Optimisation