DIPTA DAS

Software Engineer

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Passionate Software Engineer with 2+ years of professional experience in developing Kubernetes utility tools in Golang. Possess an M.Sc. in Computer Science with two years of research experience in microservice architecture in Java and Spring Boot.

EXPERIENCE

Graduate Research Assistant

Baylor Cloudhubs Lab

August 2019 – Present | Waco, TX, USA

Uses: Java, Spring Boot, Static Code Analysis

- Writing Spring Boot projects to perform Static Code Analysis to derive AST from program source code and bytecode.
- Lead a small team to conduct research collaboration on log analysis with Red Hat, Czech Republic.
- Developed a virtual conference hosting site for ACM SAC 2020.

Software Engineer

AppsCode Inc.

April 2017 – April 2019 | Dhaka, Bangladesh

Used: Golang, Kubernetes, Docker, gRPC, HAProxy

- Developed custom-resource (CRD) controllers for Kubernetes clusters.
- Extended third party open-source project Restic, the backbone of the Stash, for Google Cloud Bucket and Azure Blob Storage.
- Improved the Ingress CRD structure of the Voyager project and integrated HAProxy hitless reload for L4 & L7 loadbalancing.
- Developed KubeCI from scratch, a Kubernetes native serverless platform, workflow-engine, and CI/CD system. Integrated Github with KubeCI to facilitate GitOps.
- Developed tools to configure VMs for provisioning Kubernetes cluster in GCP, AWS EC2, Azure, and DigitalOcean Droplet.
- Implemented synchronization of k8s configmaps and secrets across multiple clusters in Kubed project.
- Wrote gRPC based API servers. Integrated monitoring for containers using Prometheus metrics and Grafana.

EDUCATION

M.Sc. in Computer Science

Baylor University

Aug 2019 – Present | Waco, TX, USA

CGPA: 3.90 **Thesis:** Detecting RBAC security violations within containerized microservices.

B.Sc. in Computer Science and Engineering

Chittagong University of Engineering and Technology

May 2012 – April 2017 | Chittagong, Bangladesh

CGPA: 3.59 **Thesis:** Improving quality and performance of BKZ lattice reduction algorithm.

LIFE PHILOSOPHY

"Hard work pays off."

PERSONALITY

ISFJ-T (Turbulent Defender)

16personalities.com/profiles/b03d6ca61308c

SKILLS

Java | Spring Boot | Golang | C++

Docker | Kubernetes | GCP | AWS

Postgres | MySQL | MongoDB

gRPC | Prometheus | HAProxy

MOST PROUD OF

Competitive Programming

- Participated and ranked well on 50+ onsite programming contests.
- Divisional champion of **ACM ICPC** Dhaka Regional 2014 and 2015.
- Champion of USTC IUPC 2015 and Divisional champion of RUET NCPC 2015.
- Solved 2000+ problems on different online judges.
- **Expert** at Codeforces with highest contest rating 1707.
- Contributed as a problem setter in 10+ programming contests.

Open Source Contribution

Contributed 20+ open source projects by implementing new features, bug fixing, and issue reporting.

Leadership

- Worked as the lead developer of Voyager, Stash, KubeCI open-source projects.
- Lead a small team for log analysis project in collaboration with **Red Hat**.
- Served as vice-president of CUET COMPUTER CLUB.

PROJECTS

Voyager

https://voyagermesh.com

Voyager is a HAProxy backed secure L7 and L4 ingress controller with some extended features for Kubernetes. This can be used with any Kubernetes cloud providers including bare metal clusters.

- Extended core features including HaProxy hitless reload, Let's Encrypt certificate integration, SSL termination, SSL passthrough, TCP SNI, etc.
- Integrated OAuth2 to support authentication using Github, Google, Facebook, and OpenID.
- Improved the Ingress CRD structure for better user experience.

Stash

https://stash.run

Stash is a cloud-native data backup and recovery solution for Kubernetes workloads. Under the hood, it uses Restic for backup and restore purposes.

- Extended open-source project Restic to support Google Cloud Bucket and Azure Blob Storage.
- Improved volume backup and implemented initial database backup system.

KubeCI

https://github.com/kube-ci/engine

KubeCI is a Kubernetes native serverless platform, workflow orchestrator, and CI/CD system.

- Developed KubeCI from scratch.
- Integrated Github with KubeCI to facilitate GitOps.

RAD

https://github.com/cloudhubs/rad

RAD (REST API Discovery) detects inter-microservice REST communication to perform software architecture reconstruction for microservice mesh.

- Implemented RAD from scratch using bytecode analysis and extended further using source code analysis.
- Utilize RAD into a separate projects for RBAC inconsistency and code smell detection.

FLARN

https://flarn.netlify.app

Flarn is a learning portal for people of all ages with different academic backgrounds.

- Prepared initial design documentations and performed feasibility analysis.
- Implemented the backend of the Flarn project using Spring Boot.
- Wrote unit and integration tests. Integrated CI/CD pipeline and executed production deployment.

OSS CONTRIBUTIONS

Kubernetes

https://github.com/kubernetes/kubernetes

An open source system for managing containerized applications across multiple hosts.

Restic

https://github.com/restic/restic

A backup program that is fast, efficient and secure.

helm/charts

https://github.com/helm/charts

Curated applications for Kubernetes.

Azure SDK for Go

https://github.com/Azure/azure-sdk-for-go

Provides Go packages for managing and using Azure services.

Javassist

https://github.com/jboss-javassist/javassist

Java bytecode engineering toolkit.

go-sh

https://github.com/codeskyblue/go-sh

Provides easy to call shell with golang.

PUBLICATIONS

- Das, Dipta et al. (2021). "On automated RBAC assessment by constructing a centralized perspective for microservice mesh". In: *PeerJ Computer Science*.
- Cerny, Tomas et al. (2020). "On Code Analysis Opportunities and Challenges for Enterprise Systems and Microservices". In: *IEEE Access*.
- Walker, Andrew, Dipta Das, and Tomas Cerny (2020). "Automated Code-Smell Detection in Microservices Through Static Analysis: A Case Study". In: *Applied Sciences*.