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16th August 2024

CNCF Mentorship Selection Committee

Dear Members of the Selection Committee,

I am writing to express my interest in the LFX Mentorship project **"CNCF - Inspektor Gadget: DNS/HTTP Event Generation Capabilities (2024 Term 3)"**. As a third-year student majoring in Artificial Intelligence and Data Science at Vishwakarma Institute of Technology, India, I have developed a strong foundation in backend development, networking protocols, and containerized environments. My coursework included DNS/HTTP protocols, and my hands-on experience with Golang and Kubernetes aligns closely with the project.

I discovered the **LFX Mentorship program through various Medium blogs** written by past mentees and open-source contributors. These blogs provided insightful perspectives on the program's structure, the **impactful projects** available, and the supportive community within the CNCF ecosystem. Their **experiences** and the opportunity to **network** and **work on real-world open-source projects** inspired me to apply for this mentorship.

I am eager to leverage the LFX Mentorship opportunity to advance my skills through a project focused on developing a Microservices-based E-commerce Platform using Golang. This project involves constructing a set of microservices in Golang to handle essential e-commerce functionalities, including user management, product catalog, and order processing. Utilizing RESTful APIs for service communication and Docker for containerization, I aim to create a scalable and efficient system.

In addition to my coursework and projects, I have conducted research that is directly relevant to this mentorship. Specifically, I explored **event-driven architectures within Kubernetes environments**, focusing on methods for triggering and monitoring DNS/HTTP events. This research allowed me to analyze various strategies for event generation and assess their impact on system reliability and performance. For example, I evaluated the use of **custom resource definitions (CRDs)** and **Kubernetes operators** to **manage event generation**, as well as implementing sidecar containers to handle DNS/HTTP requests in a controlled environment. These insights will be invaluable as I work to develop similar features within Inspektor Gadget.

Our project employs the first approach, which involves direct interaction with the **Kubernetes API** using **client-go** to automate DNS event generation. This method allows us to manage DNS tracing tasks natively within the Kubernetes cluster, providing fine-grained control over resource creation and monitoring. By leveraging client-go, we ensure seamless integration with Kubernetes components and direct access to cluster resources. This approach is advantageous for scenarios requiring close interaction with Kubernetes and high customization capabilities. It enables us to create a robust, internally managed solution tailored to our specific needs.

My **Research Work, Timeline** can found on the below Link: INSPECKTOR GADGET

I am excited about the opportunity to contribute my skills and knowledge to this effort and to learn from the experienced professionals involved in the project.

I am confident that my background, combined with my passion for tackling complex technical challenges, makes me a strong candidate for this mentorship. I look forward to the possibility of contributing to the CNCF community and helping to advance the capabilities of Inspektor Gadget.

Thank you for considering my application. I look forward to discussing how my skills and experiences align with the goals of this mentorship.

Yours sincerely,
Garvit Khandelwal