Kubernetes Client Framework & Case-Study KubeVirt

Degree programme:

Kubernetes is the leading platform for orchestrating containerized applications, but its complexity can hinder adoption across diverse business units. This thesis introduces the Kubernetes Client Framework (KCF), designed to simplify Kubernetes resource management through an intuitive user interface across multiple languages.

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Innovation and Approach:

KCF leverages the Operator pattern in Kubernetes to automate complex tasks and extend platform functionalities beyond native capabilities. Recognizing the limitations of traditional Kubernetes clients, which are often language-specific and not easily accessible to non-experts, KCF is developed using GoLang compiled into WebAssembly (Wasm) with JavaScript bindings. This innovative approach allows the framework to integrate seamlessly into various programming environments, making Kubernetes features accessible through both frontend and backend applications.

Case Study—KubeVirt Integration:

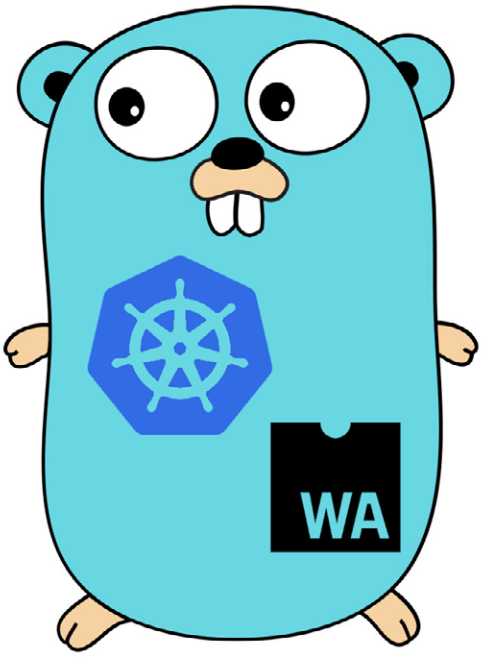
To demonstrate the practical utility of KCF, the thesis conducts a case study involving KubeVirt, a project that brings virtual machine management to Kubernetes clusters. Through KCF's intuitive UI, users can perform create, read, update, and delete (CRUD) operations on KubeVirt's VirtualMachine resources without requiring deep technical knowledge of Kubernetes or virtualization technologies. This integration showcases how KCF can simplify complex operations and make advanced features accessible to a broader audience.

Overcoming Challenges:

The development faced challenges like compiling GoLang to WebAssembly and integrating Rust due to current limitations. By innovatively using JavaScript bindings with GoLang, these hurdles were overcome, resulting in a versatile and secure framework.

Conclusion:

This thesis demonstrates how the Kubernetes Client Framework (KCF) effectively addresses the complexities of Kubernetes management. By providing an intuitive user interface and leveraging technologies like GoLang and WebAssembly, KCF bridges the gap between Kubernetes experts and non-experts. The successful integration with KubeVirt underscores its practical utility and potential to streamline operations across various business units. Moving forward, KCF can serve as a foundation for further innovations in simplifying cloud-native technologies and promoting wider adoption across industries.



Gopher, Kubernetes, Wasm