ABSTRACT

In this digital era, companies face demands to strengthen their IT infrastructure to manage data efficiently, securely, and scalably. PT. Pelayaran Nasional Indonesia (PELNI), a large company in the shipping industry, has an urgent need to enhance the management of its complex data center infrastructure. With rapid data growth, PELNI is exploring the use of Kubernetes and microservices architecture to improve the efficiency and availability of services in their Data Center Infrastructure Management (DCIM) applications.

This final project aims to design, implement, and evaluate a Kubernetes-based infrastructure using a microservices architecture for the DCIM application at PT. PELNI. The design process includes identifying system requirements, selecting the appropriate architecture, and configuring the Kubernetes cluster. Implementation involves configuring Kubernetes, setting up containers, and deploying the DCIM application as a series of separate services.

The results of this final project show that Kubernetes, with its features of automation, scalability, and dynamic resource management, can enhance operational efficiency and the availability of PELNI's data center infrastructure. The application of microservices architecture enables independent services that are more fault-tolerant, scalable, and easier to maintain and test. This study also identifies technical challenges such as managing stateful applications and orchestrating microservices, as well as opportunities arising from the implementation of Kubernetes and microservices in a large company environment. Thus, this research provides practical guidance for the implementation of Kubernetes and microservices architecture in similar industrial sectors.

Keywords: *kubernetes, DCIM, microservices*