

## ABSTRACT

Moodle is one of the media for learning management systems that are widely used today because non-face-to-face learning is unavoidable. Fluctuating user traffic makes moodle suitable for deployment to a public cloud. Public clouds are easier to scale, especially when combined with a container orchestrator such as Kubernetes. However, there are times when it is necessary to migrate data on a Kubernetes cluster from a public cloud to another public cloud to mitigate disasters in a specific region in the public cloud. Moodle applications can be routed to different regions, but this will cause high latency. This problem can be solved by migrating the Kubernetes cluster on Google Cloud to the same region on Microsoft Azure as an alternative public cloud.

This final project will discuss the migration of a kubernetes cluster along with persistent volume data between public clouds from Google Cloud Platform to Microsoft Azure and vice versa using backup and restore methods. Velero is used as a backup and restore tool, then the restic plugin is added so that Velero can also backup and restore persistent volumes located outside the Kubernetes cluster.

The test results show that Velero with the restic plugin can backup and restore persistent volumes outside the cluster. The larger the data size, the longer the backup, restore, and migration time will be. Backup and restore time for each incremental size of approximately 500 MB will increase the backup and restore time by approximately 10 seconds. Meanwhile, on the utility side, the amount of CPU usage during restore consumes more resources than when backup. At the time of backup, the maximum CPU spike was 3.5% at 3 GB data size in both public cloud clusters. Meanwhile, at the time of restore, the maximum CPU spike is 5% at 3 GB of data size.

**Keywords:** Kubernetes, Public Cloud, LMS, Migration.