**A comparison between four-tier framework and three-tier framework for online applications of 3D GIS visualization**


ABSTRACT

Online application of 3D visualization for GIS (Geographic Information System) data is of interest to not only professionals such as cartographers, geographers, geologists and psychologists but also popular among the ordinary people. The system's conventional design is generated from client/server based architecture. This architecture is the main platform for designing the online system architecture, which works based on the distributing concept which is "tier". The tier is required to separate the works/tasks between the system architecture. Currently, three-tiers architecture is the most well-known architecture used in GIS applications and other application. However, this architecture has a drawback on the middle tier which needs more processing power to meet the request from multiple of users. GIS applications, especially which involve 3D visualization generate a massive amount of data. Due to this situation, the use of the current three-tier framework for online application of 3D visualization for GIS will decrease the performance of the system in terms of time for processing the request from the users. The aim of this study is to introduce the new four-tier framework and compare it with the existing three- tier framework. This framework consist of four-tier architecture, which is divided into client tier, logic tier, visualization process tier, and database tier. The comparison is based on response time, loading time, frames rate per second, CPU usage, and memory usage. The new framework shows superiority in its performance, and the processing power is reduced.



**Keyword:** Tier; Four-tier; Three-tier; 3D visualization; Client/server