UNIVERSITI TEKNOLOGI MARA

REAL-TIME
SPATIAL DATA CONVERSION
OVER CLOUD COMPUTING

NOR HASIMAH BINTI CHE MAT

Dissertation submitted in fulfilment
of the requirements for the degree of
Master of Science in Computer Networking

Faculty of Computer and Mathematical Sciences

July 2015

ABSTRACT

Geographical Information System (GIS) technology provides location-based services by manipulating geometry information to help users to navigate and spot a specific location that they are interested with. In the aspect of infrastructure facilities, GIS is also important to determine the exact location of any event related to road, such as road accident locations, census stations located along Federal and State roads in Malaysia in order to collect data of traffic volume, traffic growth and highway capacity for the purpose of monitoring and maintenance. The demand of road assets location also keeps on growing exponentially from time to time since the information is closed related to other facilities such as transportation, traffic, drainage and more others. However the rapid growth of massive spatial data requires real-time data processing to achieve rapid response mechanism of the system. On top of that, spatial data comes from multiple sources and in various formats also posed a great challenge to the developer to convert the data into standard format so that it can be shared with other parties for mutual benefits. Therefore, this study is to test the performance of real-time spatial data conversion of road data compared to the traditional method, batch conversion. By having good scalability, high reliability and high availability, cloud computing can provide powerful technical support in order to promote the capability of spatial information service. Meanwhile the powerful computing capacity provided by cloud computing services also can help to meet the real-time processing of a large amount of road spatial data. Thus, the purpose of this study is to provide an organised spatial data of road event and a better data sharing between agencies that responsible on the road assets management. Based on the study that had been carried out, it proved the spatial data conversion in real-time processing was more efficient than batch processing in term of process complexity and time cycle. Thus with these findings, it can be concluded the spatial data sharing are more efficient by implementing real-time spatial data conversion over cloud computing rather than batch spatial data conversion.

ACKNOWLEDGEMENT

"In the Name of Allah, the Most Gracious and the Most Merciful"

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CHAPTER 1

INTRODUCTION

This research is done to propose a spatial data conversion in the field of Geographical Information System (GIS) by implementing cloud computing technology. In order to handle and share big data of spatial data that available in various formats, an efficient data conversion is needed to ensure the data can benefits to all users regardless what software they use. In addition the data also should be accessible at anytime and anywhere in a safe, fast, updated and accurate manner. Since diversified development of data format that used to describe a sort of spatial item, it is a need to realise a conversion between different data formats in order to make use of available data effectively, and realise data sharing and interaction.

1.1   BACKGROUND OF STUDY

The development of GIS technology has improved the traditional system of GIS data by providing an open platform, for the ease of sharing and exchanging the spatial data. However it is not an easy implementation since there are some issues need to be overcome such as diverse distribution of spatial data, the various resources of acquisition means, and the variety of storage formats. Thus it is necessary to carry out spatial data conversion to solve the bottleneck problem of spatial data multi-formats in order to enable the geographic information can be shared and optimized (Xueqin Yu & Zhang, 2013).

Digitized spatial data consist of several metadata that attached with its attributes, provides geometry information to locate a specific location. It involves a huge amount of geometry data computation that can be produced in various formats, for instance Shapefile (*.shp), csv, MapInfo (*.TAB and *.DAT), and AUTOCAD (*.dwg). in order to represent geographic features to the users. Each format is produced by different GIS application platform such as ArcGIS, MapInfo, Autodesk, and Quantum. In order to let these different data formats can be used by other parties, the data need to be converted into standard format so the users can use the spatial data freely and easily. Traditionally, data conversion can be done as follows: