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The development of a Java based GIS viewing tool

A thesis presented in partial fulfilment of the requirements for the degree of

Masters of Technology

in Information Engineering at

Massey University

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1999

Abstract

Geographic Information Systems (GIS) industry sources quote the ratio of power users to casual users at 1000:1, within New Zealand this figure has been found to be 30:1. The casual user is often under-supported, with slow and cumbersome viewing tools. This project implements a full data download system in Java for use with Genasys (New Zealand) GIS software.

Three components were developed; a vector data handler, an image download system, and a database client. These components were integrated to form a powerful client that offered a significant performance increase over the "server based" client. The image download system outperformed the "server based" client by over 400%. The vector data handler outperformed the "server based" client by over 50%, while the database client was over 250% quicker.

GIS users rated all components to be of significant benefit, offering improved performance over their current GIS viewing tools. The work completed in this thesis provides Genasys (New Zealand) a useful tool to enable powerful, fast and stable Java based GIS viewing clients.

Keywords: ***GIS, Java, computer graphics, image pyramid.***

Acknowledgements

During the course of this project, I have been helped by numerous people. I would like to take this opportunity to thank all those people. I have listed a few below, without them this project would never have occurred.

Special thanks to Genasys New Zealand - Philip, Susan, Richard and Deborah - for providing the tools and technology for this project, and for fixing my problems.

To Genasys Australia - Bruce Lundy and co. Thanks for developing and providing the Spatial Nucleus toolkit.

To Hauraki District Council - Rex Leonhart, Matthew Radford for helping out when I needed it most.

Thanks to my family - Especially to Kate for doing lots and lots of proofing.

Special thanks to Wyatt Page and his purple cast, for all the great ideas, support and proofing.

Finally, I would like to thank Emma for putting up with me and then looking after me, oh and for the proofing too.

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Glossary

Cadastral	The legal definition of a land parcel as opposed to the physical boundary, which could be, made up of natural features like fences and hedges etc.
Class	A Java class file is the platform independent compiled source code.
Daemon	A daemon is a program that runs continuously and exists for the purpose of handling periodic service requests that a computer system expects to receive. - Source: http://www.whatis.com
GIS	A Geographic Information System (GIS) is composed of groups of functions that manipulate spatial and attribute data. These functions embody the concepts of cartography, geodesy, mathematics and computer science. The purpose of the GIS is to provide the combined power of these disciplines for problem solving at a variety of levels of user expertise
GPS	Geographic Positioning System is a device that obtains its geographic position from a group of satellites orbiting the earth.
Raster	A raster image is a digital representation of an image. It consists of a value for each dot of the image, each dot is known as a pixel or picture element.
RDMBS	An RDBMS (relational database management system) is a program that lets you create, update, and administer a relational database
Socket	A socket is a method for communication between a client program and a server program in a network. A socket is defined as "the endpoint in a connection." - Source: http://www.whatis.com
TCP-IP	TCP/IP (Transmission Control Protocol/Internet Protocol) is the basic communication language or protocol of the Internet. - Source: http://www.whatis.com
TIFF	TIFF(Tag Image File Format) is a common format for exchanging raster (bitmapped) images between application programs
Vector	a sequence of commands or mathematical statements that place lines and shapes in a given two-dimensional or three-dimensional space