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The development of a Java based GIS viewing tool

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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.*

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Contents

Chapter I.	Introduction	19
Section 1.01	Thesis Overview	20
Section 1.02	Contents By Chapter	21
Chapter II.	GIS, Genasys and Java	23
Section 2.01	GIS.....	23
Section 2.02	Genasys	25
Section 2.03	Genasys Software	25
Section 2.04	Java	28
Chapter III.	Large Image Handler	32
Section 3.01	Introduction.....	32
Section 3.02	Pyramid Structure	35
Section 3.03	Image Server.....	38
Section 3.04	Java Image Implementation.....	39
Section 3.05	Image Client	40
Section 3.06	Performance	44
Section 3.07	Summary.....	45
Chapter IV.	Database Client For Java	47
Section 4.01	Introduction.....	47
Section 4.02	Typical Scenario for Database Use	47
Section 4.03	Structure & Commands of GenaMap Database Servers.....	49
Section 4.04	Description of Standards used in Database Server.....	49
Section 4.05	Suitability of Java for Implementation of RPC.....	53
Section 4.06	RPC & XDR Implementation.....	54
Section 4.07	Database Server Security	57
Section 4.08	Performance	58
Section 4.09	Conclusion.....	61
Chapter V.	Vector Data Handler.....	63

Section 5.01	Vector Server.....	64
Section 5.02	Vector Client	69
Section 5.03	Symbology	71
Section 5.04	Java 2D API.....	72
Section 5.05	Performance	74
Section 5.06	Conclusion	76
Chapter VI.	System Integration.....	77
Section 6.01	Client integration.....	77
Section 6.02	Client User Interface.....	79
Section 6.03	GenaMap scripting access	80
Section 6.04	Conclusion	80
Chapter VII.	User Evaluation	83
Section 7.01	Evaluation Description	83
Section 7.02	Evaluation Results.....	84
Section 7.03	User Comments	86
Section 7.04	Conclusion	87
Chapter VIII.	Project Difficulties.....	89
Section 8.01	Java.....	89
Section 8.02	Interaction With Genasys.....	90
Chapter IX.	Discussion and Conclusions	91
Section 9.01	Client Developments	91
Section 9.02	Java Developments	92
Section 9.03	Conclusion	93
Appendix I.	Java Performance.....	95
Section I.I	Java performance problems	95
Section I.II	Comments from James Gosling.....	98
Appendix II.	Image Pyramid Setup Instructions.....	99
Appendix III.	Performance Results	100
Section I.III	Database Client.....	100

Section I.IV Large Image Handler Client	100
Section I.V Vector Data Handler	101
Appendix IV. Genasys API Documentation	102
Section I.VI Request Broker API.....	102
Section I.VII Symbology Primitives	104
Appendix V. TIFF Specification.....	106

List Of Figures

• Figure 1 Genasys Office Locations.....	25
• Figure 2 MGIS Client Viewer.....	28
• Figure 3 Process of compilation to platform independent bytecode format	30
• Figure 4 Image Resolution Example.	36
• Figure 5 A four level dyadic image pyramid.	37
• Figure 6 Incremental Drawing Of Image	40
• Figure 7 Image Memory Object Example Operation	43
• Figure 8 Image Zooming and Panning	44
• Figure 9 Cumulative Image Zooming and Panning	45
• Figure 10 Example Navigation performed in the intranet client to country "Austria".....	48
• Figure 11 RPC Client & Server Processes	51
• Figure 12 Comparison of Database Methods	61
• Figure 13 Vector Server and Client Communication	68
• Figure 14 VectorInputStream structure	70
• Figure 15 Symbology rendering based on attribute and spatial data	71
• Figure 16 Vector Data Zooming and Panning Operation Times.....	74
• Figure 17 Vector data cumulative times, including initial loading time.....	75
• Figure 18 Vector data cumulative times, excluding initial loading	76
• Figure 20 Integrated vector data handler and large image handler.....	79
• Figure 21 User Interface Functionality Results	85
• Figure 22 Image Handler Evaluation Results.....	85
• Figure 23 Vector Handler Evaluation Results	86

List Of Tables

- Table 1 Comparison between Java, C++ and Visual Basic modified from Byte..... 31
- Table 2 GenaMap Database Server command descriptions 49

List of Code Fragments

- Code Fragment 1 Image Pyramid Definition File 37
- Code Fragment 2 Sample Image Registration ".IF" File 38
- Code Fragment 3 Annotated RPC procedure TCP-IP trace 52
- Code Fragment 4 RPC Message Structure 52
- Code Fragment 5 Structure of RPC Call Message 53
- Code Fragment 6 RPC Reply Message Structure 53
- Code Fragment 7 XDRDecoders class Functions 55
- Code Fragment 8 XDREncoders class functions 55
- Code Fragment 9 Java RPC Interface Class 56
- Code Fragment 10 DBExec Implementation 57
- Code Fragment 11 Genamap Script To Retrieve Data from External Database 59
- Code Fragment 12 Java Database Retrieval Test 60
- Code Fragment 13 Genasys Shared Library Interface Functions 66
- Code Fragment 14 Example of accessing native code from Java 67
- Code Fragment 15 'C' Native Code Headers 67
- Code Fragment 16 Elipse2D shape object used as a filled shape 73

Glossary

<i>Cadastral</i>	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.
<i>Class</i>	A Java class file is the platform independent compiled source code.
<i>Daemon</i>	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
<i>GIS</i>	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
<i>GPS</i>	Geographic Positioning System is a device that obtains its geographic position from a group of satellites orbiting the earth.
<i>Raster</i>	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.
<i>RDMBS</i>	An RDBMS (relational database management system) is a program that lets you create, update, and administer a relational database
<i>Socket</i>	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
<i>TCP-IP</i>	TCP/IP (Transmission Control Protocol/Internet Protocol) is the basic communication language or protocol of the Internet. - Source: http://www.whatis.com
<i>TIFF</i>	TIFF(Tag Image File Format) is a common format for exchanging raster (bitmapped) images between application programs
<i>Vector</i>	a sequence of commands or mathematical statements that place lines and shapes in a given two-dimensional or three-dimensional space

