WEB-IS (Integrated System): An Overall View

Introduction:
Researchers in the geosciences are being faced with a deluge of large-scale datasets that need to be analyzed in a fast and efficient manner. We have developed an interactive web-based scheme for data-mining large datasets using three distinct techniques all of which utilize a client-server paradigm. Our system, called WEB-IS (Web-Based Integrated System) employs the power of a server to visualize and analyze data in a web-service scheme. WEB-IS1 (http://isb.msi.umn.edu/web-is) extracts multi-resolutional structures in seismic catalogs through cluster analysis. Off-screen rendering is then applied on the server which allows the client to view the results in 3-D. WEB-IS2 (http://isb.msi.umn.edu/amira) exploits the ease of use in the powerful visualization package Amira (www.amira.com) through a web-based module which allows for manipulating and analyzing 3-D datasets. WEB-IS3 (http://tono.msi.umn.edu/~max) is an imaging service which displays selected features from a low resolution environment to one with increased resolution by zooming into the data. We have used a wide variety and combination of programming languages for seamless integration of server-side processing and client-side interaction utilities. Our aim with this software tool is to overcome the software limitations of a thin client by harnessing the power of a large visualization server using a simple web interface.

Figure 1: The three sub-modules of WEB-IS (Integrated System)

WEB-IS Server

WEB-IS1

WEB-IS2

WEB-IS3

The Integrated System:
WEB-IS components allow the user to analyze their datasets in different scenarios. The three WEB-IS nodes apply to different scenarios but serve the same objective, and all three are based on the client-server paradigm.

Figure 2: The WEB-IS client/server

WEB-IS Server

HTTP Server (viewed as HTML, pages from www.

The Infrastructure:
We integrate a combination of programming languages into our software to complete the client server paradigm.

Figure 3: NaradaBrokering & WEB-IS

NaradaBrokering:
In the future, NaradaBrokering (Integrated Asynchronous Real-time Adaptive Distributed Architecture) will act as a middleware in our system by utilizing the power of distributed servers while integrating server-side processes with client-side utilities.

Future Work:
Fast two-way communication between client and server will be considered for GRID purposes using SOAP (Livingston, D., Advanced SOAP for Web development, Prentice Hall, 2002). Future use of WEB-IS in the GRID computing environment is being explored using the Narada-Brokering (www.naradabrokering.org) method.

References: