

CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES

TRIP REPORT

SUBJECT: North Carolina Geographic Information System Workshop

DATE/PLACE: February 28–March 2, 2001, Benton Convention Center, Winston-Salem, North Carolina

AUTHOR: Chuck Connor

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PERSONS PRESENT: Chuck Connor

BACKGROUND AND PURPOSE OF TRIP:

Connor was invited to give a lecture on real-time visualization of geophysical data at the North Carolina Geographic Information System Workshop, held in Winston-Salem. The goal of the workshop is to bring together geographic information system (GIS) users from throughout North Carolina, including Local, State, and Federal Agencies and Universities, to discuss topics in GIS. Connor was invited to present material previously published in the Linux Journal. The conference was attended by 834 people.

SUMMARY OF PERTINENT POINTS:

The keynote address was given by Jack Dangermond, founder and president of ESRI, and developer of ArcInfo and ArcView. Dangermond covered topics related to GIS on the Internet and described a vision of on-line map making and open source data. Connor asked how licensing of software fits into this vision and Dangermond indicated that software would have to become open-source, at some level.

A heavy Linux emphasis permeated the conference, largely because the Research Triangle is a locus for much of Linux development. Doug Newcombe gave a talk on the plethora of open-source and freely available GIS software for Linux and other Unix operating systems. Much of this software (including Windows applications) is available at the www.freegis.org. Connor also obtained a CD ROM from Newcombe that includes several software packages for remote sensing data manipulation and GIS. These include GRASS, OSSIM, and OPENEV. GRASS is a GIS package that has developed rapidly during the last several years. It is now reported to be fully compatible with ARC import and export and performs much of the same function. More information about GRASS is available at www.baylor.edu/~grass. OSSIM is designed for processing of remotely sensed data types. A crucial feature of OSSIM is that it is designed to run in parallel on beowulf clusters and similar distributed computational platforms. This feature greatly increases the speed with which image transformations are accomplished while keeping the cost low. More information about OSSIM is available at www.remotesensing.org/ossim. OPENEV is also available for Windows and Linux OS. OPENEV is a very straightforward and easy to use GIS. It also handles ARC import and export and similar formats. More information on OPENEV is located at openev.sourceforge.net. Numerous utility

packages (e.g., format conversion and data coordinate transformation utilities) are also available at www.freegis.org or on the CD-ROM.

Jon Hall, president of Linux International, presented an overview of Linux and its application to GIS. Hall pointed out that the Linux OS has now been installed on approximately 40 million machines, double the number of installations compared to one year ago. Hall indicated that Linux is now the most common operating system in several countries, including Norway and China. Hall also indicated that open-source code distribution has become a financial success for numerous organizations that develop technical software. Essentially, the open-source approach develops a customer base, and this customer base requires modifications, instruction, and code enhancements. Hall also indicated that open-source software is more easily controlled, for example in a QA program, than proprietary software because the actual code can be reviewed and preserved.

Forrest Hoffman and William Hargrove (Oak Ridge National Lab) presented their experience developing a beowulf cluster. Their cluster now consists of 128 nodes. Hoffman and Hargrove run non-hierarchical cluster analysis applications in parallel on their beowulf cluster for mapping ecological zones in the United States. Their common runs are on the order of 7,000 CPU hours (approximately 54 hours of total runtime using 128 nodes), to perform a cluster analysis using 27 parameters on a 1×10^8 node map of the US.

Lynn Peterson (EPA super-computing center) presented the scope of work at the EPA for visualization of scientific datasets. Peterson presented scientific visualization of atmospheric dispersion models, mostly for simulating gas release in urban environments. Peterson indicated that EPA is considering shifting from SGI to Linux OS gradually over the next several years.

Connor presented work on real-time visualization of geophysical data. This presentation stems from research in the Yucca Mountain area and elsewhere, where CNWRA staff have used codes developed in-house to visualize magnetic and electromagnetic data as the survey progresses. Reaction to the talk was quite favorable. Doug Newcombe (U.S. Fish and Wildlife) indicated that he would call Connor about application of these techniques to floodplain characterization in North Carolina. Lynn Peterson (EPA) asked if Connor would also present this talk at the EPA.

IMPRESSIONS/CONCLUSIONS:

The GIS conference was extremely informative. CNWRA software for real-time visualization of geophysical data remains unique and of interest to the GIS community, even three years after its development.

PROBLEMS ENCOUNTERED:

None.

PENDING ACTIONS:

Connor will follow-up with Doug Newcombe about open source software.

RECOMMENDATIONS:

CNWRA and NRC staff may wish to evaluate software available at www.freegis.org and the other websites provided previously. This software can be downloaded directly from the website or obtained from Connor. Connor and DelaEspriella, time permitting, will install OSSIM on the CNWRA beowulf cluster to assess its utility compared to our commercial image analysis codes.

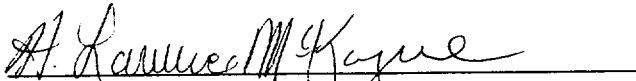
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Chuck Connor
Principal Scientist

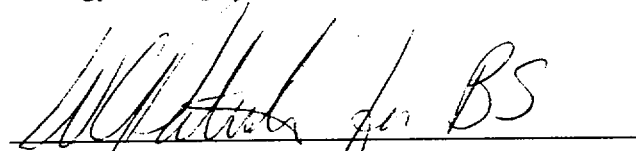
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