

Open Source GIS Fights the Three-Horned Monster

By Paul Ramsey

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THEY SAY YOU CAN HAVE YOUR SOFTWARE GOOD, cheap or soon, but you can't have all three. Information technology (IT) project managers have assumed since the dawn of microchips that any improvement in one measure of software quality must inevitably be accompanied by a reduction in others.

Last year, Ross Searle of the Department of Natural Resources and Mines, Queensland, Australia, faced this "three-horned" IT dilemma. He had a problem, and the solution had to be cheap, quick and good. Searle wanted to create an online permitting application that allowed resource officers in his department to quickly evaluate the environmental consequences of tree-clearing permits.

"In Queensland, our state government has legislation controlling the clearing of trees," says Searle. "If a landholder wishes to clear trees, then he or she has to apply for a permit. A permit will only be issued if the clearing does not cause environmental degradation. The state government has the role of assessing the permits. To do this, officers need access to a broad range of datasets all generally held in GIS form."

The three-horned dilemma loomed. The application had to be cheap—budgets for the department were shrinking, no discretionary funding was available, and all the existing licenses for proprietary Web mapping software were tied up in the departmental head office. The application had to be good—data volumes were huge, encompassing several spatial coverages of more than 500MB apiece, so lightweight solutions weren't going to work. The application had to be ready soon—Searle didn't have the

time or money to program a complex system from scratch.

Searle slew his three-horned dilemma with a combination of "open-source" tools, using the University of Minnesota (UMN) MapServer (<http://mapserver.gis.umn.edu>) to provide Web mapping capabilities and PostGIS/PostgreSQL (<http://postgis.refractions.net>) as the spatial database backend.

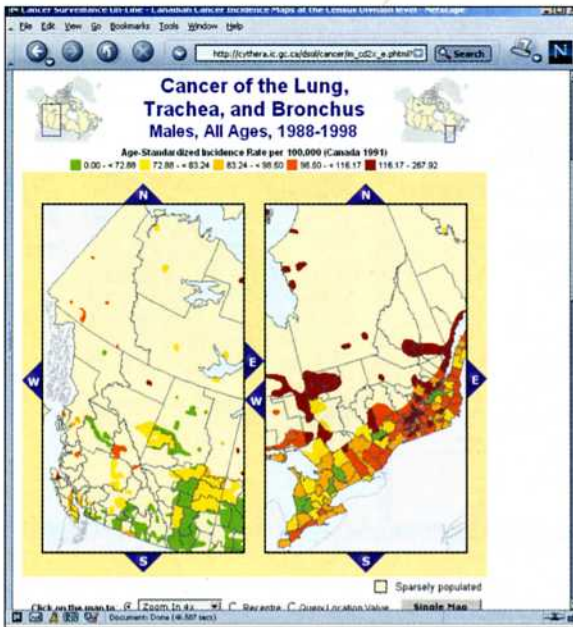
"We are using PostGIS to deliver large amounts of natural resource information via a MapServer interface," adds Searle, "The MapServer/PostGIS application allows users to quickly search for a parcel of land and bring up all the relevant information in a standard format."

"Apart from the cost factors, I believe that the open-source software for this particular purpose is every bit as good—if not better—than the solutions offered by commercial vendors. We have found that the developers of open-source software are responsive to bugs/suggestions/inquiries, etc., more than commercial vendors. In fact, one of the biggest problems we have found in using open source is keeping up with all the improvements."

What's Open Source?

Unlike "freeware" or "shareware," open-source software provides users with more than just a program and some documentation. As defined by the Open Source Initiative (<http://www.opensource.org>), open-source software "must be distributed under a license that guarantees the right to read, redistribute, modify and use the software freely."

Open-source programs are distributed along with their "source code," i.e., the programming instructions that



DM Solutions used MapServer to create GIS-based Web sites for applications such as cancer research (left) and finding hiking trails (right).

control how the software works. Using open-source software is like eating at a restaurant where the recipes are served alongside the meals—you can simply enjoy the food, but you also have the option of taking the recipe home, changing the seasonings and serving the result to your friends.

Successful open-source projects attract developers interested in improving the software. Sometimes their motives are personal, but often they're professional—the software helps solve a problem, and improvements to the software make doing their job easier. Through time, success breeds success. The projects with the most development activity attract more developers and become more active, improving and adding features at a rapid rate.

After users become accustomed to having complete access to the inner workings of the software they use, proprietary software begins to feel a little limiting, even unnatural. Bob Young, co-founder of the successful open-source company Red Hat (<http://www.redhat.com>), likes to compare purchasing proprietary software to “buying a car with the hood welded shut.”

“We demand the ability to open the hood of our cars, because it gives us, the consumer, control over the product we’ve bought and takes it away from the vendor,” notes Young.

In Young’s view, the software market should be one in which consumers don’t purchase software per se, but instead purchase whatever services they need to effectively use the software they choose. Rather than purchase a proprietary database system and then purchase support from the proprietary database company, customers instead choose an open-source database and purchase support from an array of support companies with expertise in the chosen database. The net effect is the same—customers have functioning and supported products—but the balance of power is shifted in favor of customers.

An Open-Source Economy

In a healthy open-source economy, every successful open-source software project should have an accompanying set of companies prepared to offer support and consulting to customers who choose to implement systems with the software. DM Solutions Group (<http://www.dmsolutions.ca>), for example, is one of the companies supporting the UMN MapServer—the open-source Web mapping application Searle used to implement his online permitting application. DM Solutions started as a traditional systems integrator, providing consulting services that implement proprietary software packages.

“We were frustrated with the fact that we were dealing with ‘closed boxes’ that magically did all the work for us,” says Dave McIlhagga, president, DM Solutions. “If it didn’t do it the way we wanted it to, we couldn’t change it or would have to depend and wait on a third party to take care of any problems.”

“Now [that we are using open-source software], we’re in full control of the situation and can offer not only consulting services, but also free and open software to base it on. We then can guarantee that if there are any problems in the base software, we can fix them. The word ‘workaround’ no longer is part of our vocabulary. If it doesn’t work, we fix it.”

In addition to providing MapServer consulting services, DM Solutions soon became actively involved in MapServer development, adding new features like OpenGIS Web Map Server, Macromedia Flash and GML support. McIlhagga notes that effort spent on development actually promotes consulting skills, demonstrating that “we are the industry leaders in use of the product, have a high level of expertise and can therefore offer a premium service to our clients.”

Refractions Research (<http://www.refractions.net>) occupies a similar position with respect to PostGIS/PostgreSQL, Searle’s other key application component. As the original developers

