***Matt Toon*** **speculates on the form and content of next-generation GIS**

# GIS 2000 - What's Next?

The art of prediction has always been left to the gifted and the mad. Indeed, anyone bold enough to have prophesied changes in the computer industry over the past decade would have had to be the former and would most probably have been branded the latter.

The continuing growth in computer power and availability, the impact of Microsoft and Windows, and the burgeoning of the Internet have become societal issues as well as computer phenomena. For all this, many things have not changed. Sun still makes high quality hardware for mission critical applications that does not require $n^2$ reboots every time you change a system parameter. Oracle still produces the world's most popular databases, and there is still no end in sight for UNIX.

How then will GIS develop in the year 2000? And what technological factors will make the biggest contribution? While we can only guess at the exact makeup of our 'GIS 2000' product, we can see how current industry trends are likely to shape its form.

GIS does not operate in isolation from mainstream information technology, and as it continues to mature, it becomes increasingly part of that mainstream. Oracle's 8i spatial product and Microsoft's office component, MapPoint, both illustrate how mainstream vendors are responding to the demand for spatially-enabled products. They may not qualify as true 'GIS', but it is products of this nature that will become the most widely used.

As the Internet becomes the mechanism of choice for interaction with all forms of spatial data, the term 'GIS' will be used less and less as an identifier of a product type and more as a set of functions that reside within a more focused set of functions, tied to a particular job or market. The growth of Internet mapping systems and component-based GIS over the last two years show that while more and more people are being exposed to GIS, its functionality is being provided as part of another product, not as a separate product in its own right.

Change is not always accompanied by the resources that are needed to manage that change. For example, the growth of computer usage in the 1990s left a skills shortfall among qualified computer staff that, in the corporate environment, has prompted the need for more centrally managed systems.

Again, one of the major buzzwords before Y2K was 'total cost of ownership'. It was, indeed, cheap to invest in desktop hardware; but managing and supporting all the applications could outstrip that initial cost threefold over the course of a year. The solution: bring back the centrally-managed systems of the 1970s and 80s; distribute applications to users from a centrally managed source via corporate Local Area Network, intranet or extranet. The major problem has been the heterogeneous nature of machines in a corporate environment, from PC to Mac, Sun to Linux. The answer was developed by Sun and was called Java.

Java has been variously touted as the saviour of computing or savaged for the performance of its applications. While it may still be slow, it is undeniably becoming a mainstream language for all sorts of applications - a move that has not been ignored by GIS vendors who have started introducing Java-based viewers and development toolkits.

High performance applications may still need to be written in C++, or possibly Visual Basic, but if GIS is to be delivered to the majority in a form that possesses a reasonable degree of functionality and flexibility, then it is Java that can do it. Indeed, when combined with other Internet technologies such as the Hypertext Mark-up Language (HTML) and the EXtensible Mark-up Language (XML) Java provides a robust platform for the next generation of distributed and Internet GIS applications.

With analysts predicting a boom in Internet use via television, such applications will be as applicable to the set-top as to the desktop PC. And with local government being asked to facilitate public access to all sorts of information, much of which has a spatial element, the flexibility of Java will be needed to accommodate the needs of those who come online by whatever method.

The other major revolution in the computing industry has been the development of mobile computing.

The current range of handheld and palmtop computers has opened up a completely new market for software.

Although increasingly powerful, these diminutive devices have limitation in terms of screen size, battery life and connectivity. However, in an industry where fieldwork has always been important, these Personal Digital Assistants are becoming an integral part of many jobs. There is already a range of software available for such systems, from simple mapping to route planners. As storage potential increases and wireless connectivity improves, instant data access on the move will become a reality, making GIS truly distributed.

Although GIS techniques have altered little in fundamental terms over the past decade, general trends in computing have revolutionised its use. The increasingly ubiquitous nature of GIS, be it on the Internet, in palmtop journey planners, or in spatial data warehouses, shows the importance people place on spatial data. As always, we can only look into the future in one direction and will have to wait and see how GIS 2000 evolves in actual practice. G