WHAT GI PROFESSIONALS CAN GAIN FROM IT

Google Earth

Google Earth has been mentioned at least once at every meeting or conference of GIS-related professionals Iâ€™ve attended over the past year. It was even briefly referred to during defence of a PhD thesis on SDI clearinghouses. Google Earth is about business, technology, mapping, cartography, leveraging and integrating spatial data and internet. Reasons enough to take a closer look at the search engine from a personal geo-information perspective.

The moment someone told me about Google going GIS was an exciting one for me and for many others in the professional Geo-Information (GI) community. Why? Because our discipline was suddenly receiving attention and support from one of the most innovative and influential internet companies on earth. And because looking at the Earth through the Google Earth (GE) interface was like a dream, like flying like a bird. Because at last the Earth was shown in all its beauty, without an annoying â€œLoading...â€ pop-up in front of it. By now I am used to it and things have returned to normal, so perhaps itâ€™s time to ask ourselves what we as GI professionals can learn and gain from GE. It seems that no jobs were lost, which means the change wasnâ€™t that dramatic, and Google did not make everything happen automatically, as some of us had thought or even hoped it might. But something has changed with the entrance of Google onto the GI playground. It is the view on GIS of a non-GIS company.

Technology
GE is a desktop application. Although many GIS companies are struggling to implement Web-mapping software for the wider audience rather than desktop GIS, nobody would call the GE desktop application old-fashioned. The appearance of GE is just another sign that the discussion between Web-based or desktop-based, between thin-client or fat-client, is ending. These technologies are quickly becoming integrated, firstly because modern software development platforms are breathing internet, and secondly because writing software for website or desktop application has become an almost identical enterprise. Internet-connected desktop applications connect in exactly the same way as the browser, which makes less fundamental the choice of one or the other. The choice is increasingly based solely on the required level of interaction. Further, installing software has become easy; GE requires no difficult set-up choices or server settings, and it notifies the user when a newer version is available, which is immediately installed. This has dispersed most of the disadvantages. One issue that remains is platform dependence. GE was released in June 2005, but a version for the Macintosh computer became available only in January 2006. In the Web-based GIS the same holds for browser dependence, especially when plug-ins are required, as are often necessary for Web-mapping tools. The first thing to remember is that there is a real choice between Web-based and desktop-based internet GIS, and GIS perhaps requires a higher level of user interaction than that offered by a browser-based solution.

Experience
Playing with GE for the first time, I was annoyed by the fact that interactive experience with spatial data was constantly kept at bay by the main GIS vendors, who are always computing or load-
ing new views, and always too slowly, and never responsively enough. Sometimes with a pop-up to tell you it is busy, sometimes without one, leaving you to guess for yourself, which is just as bad. Why did Google pick up the â€˜Keyholeâ€™ technology, where existing GIS vendors with a history of decades have not done so? It is because internet requires speed. In a classic paper written in 1968 and recalled by guru Jacob Nielsen in the book Designing Web Usability (New Riders Publishing, 2000), Robert B. Miller wrote, â€œOne tenth of a second (0.1) is about the limit for having the user feel that the system is reacting instantaneously [â€¦]. This would be the response time limit for any applets that allow users to move, zoom, or otherwise manipulate the screen elements in real time. One second (1.0) is about the limit for the userâ€™s flow of thought to remain uninterrupted, [â€¦] but the user does lose the feeling of operating directly on the data. Ten seconds (10.0) is about the limit for keeping the userâ€™s attention focused on the dialogue. For longer delays, users turn to other tasks while waiting for the computer to finish.â€
These guidelines still hold for modern interaction design: computers have changed a lot, but people have not. And this is not about overall performance. With GE it might take just as long for the new view to load completely, but because of the very high level of user interaction this is a totally different experience and the loading time for the new view suddenly becomes acceptable. Traditional GIS vendors have never thought about these issues in the way Keyhole and Google do, because they have an engineering background where accuracy has always been the key driver. The GI community has been too much on its own; it has neglected to look around and see how the gaming industry has found better ways to make large datasets viewable in an interactive way. This is also a matter of necessity. The coming of GE demonstrates what we have been missing. Another thing to remember is to watch more carefully what is happening outside the traditional technical-geographical community.

Web GIS
Is GE an alternative for commercial GIS software? Yes and No. No, because of lack of capabilities for analysis, an area within which modern GIS excels. Yes, because the goal is to make spatial data available online to the general public, government institutions or companies. Let us consider two simple cases.

1. Local government wants to share with its citizens all publicly relevant, spatially related information. Solution: convert the necessary layers to KML files and disseminate them by posting on a website, with relevant explanation.
2. This same local government wants to create a link between the posted information and administrative information belonging to it.

Solution: post the administrative informa-tion source to a website (usually this is already done), create the right hyperlinks in the KML files from the spatial information to the website.

Of course, in reality it may not always be this easy, but having a generally accepted internet-enabled viewer like GE, with an easy-to-understand file format like KML to add your own layers makes
the dissemination of geo-data to a large audience much easier, and there-fore cheaper. Weeks after
the introduction of GE in 2005 adventurous people were already posting their journeys in KML for anyone to see. At every point of interest a hyperlink was available direct to the relevant pictures on the journey website, updated from internet cafés. All of this is possible because in this case there is no server-side logic. It is sufficient to edit a KML file in any text editor, because these files are statically hosted on a Web-server.

Selling Ads
So should everyone involved in Web-mapping projects today switch to GE? No, unfortunately not. In my opinion, the technical capabilities of GE are sufficient for many projects. However, Google Inc is an US-based stock-market company primarily interested in maximising shareholder value. To realise this Google defines the nature of its operations thus: â€œWe provide highly targeted advertising and global Internet search solutions as well as intranet solutions via an enterprise search applianceâ€. Google does not have as its prime intention the offering of a free or almost-free GIS package, but to offer a platform with publicly available and very useful location-based data, a platform that attracts many users for many reasons. This is part of Googleâ€™s mission to â€œorganize the worldâ€™s information and make it universally accessible and usefulâ€. The company makes money from its platform by selling ads exposed as sponsored links when a user clicks on a geographic feature from a GE layer.
Of course, this is legitimate business and Google is very open about it. But it does put the capabilities of GE in another perspective. The GI community has other objectives than to help Google sell ads and consequently its demands will be different, both today and in the future. I have no influence on the future GE product; it is driven by the goals of the operating company. Only if this fails to attract users will it change. But compared to the rest of the world, the GI community is so small that Google would hardly notice if it and all our clients were to stop clicking on Google ads. This is also the reason why GE fails to offer transparency regarding sales of its server technology (prices are not available to the public): it is not possible for Google to sell ads via a GE Enterprise Server.

Business
Is it possible to do business with GE? An example of such a business is Globe Assistant, which is adding value to its clientsâ€™ information by transforming this into altitude-dependent KML files. This is of interest, for example, to property brokers. It is possible to discover from GE which houses are for sale in my favourite neighbourhood, inspect important data regarding them such as price, size and a general image of the house, and visit the sellerâ€™s website via a single mouse click. One problem is the available resolution of the satellite or aerial images offered at a certain site. To actually see the house for sale is much more useful than looking at a Landsat image with house-for-sale icons draped over it. A more fundamental problem is the GE license agreement, from which the following quotes are relevant: â€œThis Software is for non-commercial use only and [â€¦] not for the benefit of third parties.â€ And â€œYou may not use the Software [â€¦] for any commercial or business purposes for yourself or any third parties.â€
It seems one has no formal right even to use GE to display the data offered by Globe Assistant, because this may be classed as a commercial â€˜third partyâ€™. In this case Globe Assistant may have a separate agreement with Google, but it shows the weakness of these businesses. Because Google cannot add sponsored links to the third-party data it is in its interest to allow these companies only to increase the revenue gleaned from regular ads. This happens indirectly, as third parties might popularise GE, but it does not contribute directly to Google cash flow.

Culture
Google has been accused inform-ally of cultural imperialism. The default view and unit settings for GE start-up are US-oriented and a search for â€˜Birminghamâ€™ leads to the city of Birmingham, Alabama (US), with a population of 236,000 inhabitants and not to Birmingham UK with its population of 994,000 inhabitants. Cities outside the US cannot be found without adding the name of the country. It is not cultural imperialism that drives Google. Cultural imperialism is a mechanism mainly found amongst states, whereas Google is a company. This policy would be imperialistic only if the US government paid Google for these settings, which would seem unlikely. Google will become less centred on the US only if this potentially increases profits. This might indeed be the case and they havenâ€™t notic-ed, or the focus on the US market continues because it is simply the largest one. For users outside the US, this focus on America may be reason enough to leave GE well alone. I myself am really thrilled to see a Californian beach at sub-metre resolution; Iâ€™m less thrilled to then find my own hometown at just 30-metre resolution. And I am even less thrilled that I can use GE to find a pizza restaurant in New York, 6,000km distant from my home at a breeze by typing in the search bar â€˜pizza restaurant in new yorkâ€™, but that I donâ€™t find anything near my own place.

Concluding Remarks
Google Earth is a great tool for making geo-information available to large audiences at a low price, and, with some restrictions, there are even business opportunities for third parties using GE. Both the usefulness of this tool and the validity of business opportunities it offers depend on local resolution and actuality offered by the Google image database. The use of GE as the only vehicle for dissemination of geo-information is impossible because Googleâ€™s business goals are not collaborative with our own and there is little control, either legal or technical, over GE and its future development. The professional GI community can learn from GE because it presents the modern view of a leading internet company on our â€˜traditionalâ€™ GIS technology. It might become a catalyst for the GI market. The basis of the attraction of GE lies in the beauty of Earth itself. It is fascinating to rotate, zoom and pan around places on Earth and discover their beauty. I can show my children any place on earth. This is the strongest selling point for GE, and because of this unique aspect I take the commercial goals and US-centric approach for what they are. It is a pity that the GI-community has not been able to organise its own GE in a more open, culturally neut-
ral and publicly funded way, and that we need the Google brand in order to look at ourselves.