



Getting data to the masses

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Abstract: Getting Data to the Masses: An Initial Exploration into the Accessibility of Geographic Information over the Internet in Irish Local Authorities

"It is estimated that one weekday edition of today's New York Times contains more information than the average person in seventeenth - century England was likely to come across in an entire lifetime."¹ The amount of information in circulation today has mushroomed giving a new dimension to problems associated with information. Access to information is no longer concerned with just access to raw data. Data, geographical data especially, need to be provided in an easily understandable and accessible environment in order for them to be of most benefit. Furthermore data need to be relevant and current. The Internet has emerged as a viable medium for the transmission of geographic data and IGIS (or Internet Geographic Information Systems) have developed as a way of representing locationally specific data to multiple users. This paper deals with part of a project examining the accessibility of geographic data over the Internet (or Intranet) in Irish local authorities. It, also, looks at some other key factors influencing both access and the Internet itself; technology, privacy, information policy and legislation. A number of recent developments both in Ireland and internationally (e-government commitments, WIPO - World Intellectual Property Organization and the development of the Java programming language) have made this an exciting and dynamic area to look at. The project is illustrated using a preliminary case study of Dublin Corporation.

Introduction

Information takes prominence in everyday life in a way not seen heretofore with much of the workforce in industrialised countries now involved in some aspect of information acquisition, exchange or dissemination. "Information processing (as opposed to material goods) now accounts for more than half the U.S. Gross National Product" (Shenk, 1997, 29). As a consequence, information has become a valuable commodity and information based industries are accounting for an increasing share of GDP in Ireland as in other European countries. For example, the IT sector in the U.S. has grown from 4.2% of GDP in 1977 to almost double that (8.2%) in 1998 (U.S. Dept. of Commerce, 2000).

Much of the information currently in circulation, is digital and the proportion is ever increasing (U.S. Dept. of Commerce, 2000). In theory, digital information may be equated with increased accessibility by a wider range of users and in technical terms digital information can be created transmitted, duplicated, edited, merged and displayed in a far superior fashion to its non-digital predecessors. Furthermore, technologies for handling, processing, exploring and displaying the increasing amount of digital information enable more value to be extracted from certain types of digital information - notably geographic information. In reality however, political, organisational, economical, legal and cultural factors often present barriers to this utopia of information use. Therefore the storage, dissemination and accessibility of geographic information are often determined by the push pull factors associated with both the enabling aspects of improved technology and societal constraints.

Local Authorities both in Ireland and elsewhere are required by the very functions they carry out to store, use and disseminate copious quantities of geographically based information. In Ireland over recent years

¹ Quote taken from Shenk, 1997

more and more of this information is in digital format. This fact combined with improvements in technology, new legislation associated with citizen access and government initiatives has led many local authorities to seek new methodologies for both managing and transmitting the databases they are responsible for. This paper looks at these new methodologies and tools with particular reference to Dublin Corporation.

Managing Information: The challenge and the Tools for Irish Local Authorities

Several challenges currently present themselves to Irish Local Authorities. Firstly there is an increasing amount of data that requires storage, indexing, analysing and searching. Secondly, geographic or locationally specific information benefits from additional graphical tools to aid interpretation. In order to meet these requirements database management systems, digital mapping tools and GIS packages have been developed to varying degrees within Irish Local Authorities. Some Local Authorities have also produced a detailed metadata facility. These tools and technical methodologies have in part been guided by a government agency; the Local Government Computer Services Board (LGCSB) (<http://www.lgcsb.ie/>). Therefore adopted technologies are often similar across the board. For example, most Local Authorities utilise MapInfo as their preferred GIS tool and it is expected that most Local Authorities will use Intergraph's GeoMedia WebMap as their preferred Internet mapping tool. Such facilities have become all the more important in the light of the recently announced National Development Plan (Government of Ireland, 1999), the ICT Vision for Local Government (Dept. of the Environment and Local Government, 2000a) and the National Spatial Strategy which makes substantial demands on the geographic component of Local Authorities' datasets (Dept. of the Environment and Local Government, 2000b).

Transmission of information: The requirements of Speed, Currency and Accuracy

In addition to the creation and storage of geographic information, recent legislation associated with Freedom of Information (Government of Ireland, 1997) has required local government to become publicly accountable and to make more of their information available to a wider audience. In addition, many initiatives are underway in terms of community based planning and collaborative planning. Therefore, there are increased pressures to disseminate information directly to citizens. In the Local Authorities themselves, there is also a need to transmit information between departments. Technological advances such as Java programming coupled with increasing Internet use have meant that the obvious tools to address both these issues are the Internet, Extranets and Intranets, and these are the solutions that will be adopted by most Local Authorities in Ireland. At present this research project has only focussed on the largest Local Authority; that of Dublin Corporation managing the city of Dublin, but not its suburbs. It is responsible for 11,758 hectares and a population of nearly 500,000 (Dublin Corporation, 2000).

The Practice: A case study of Dublin Corporation

Dublin Corporation has one of the longest established GIS units in Ireland dating back to the early 1990s². The Corporation has shown a commitment from the early stages of GIS introduction into Ireland to provide solutions to the management of increasing amounts of digital geographic information. Initially, the Central GIS/CAD Unit was responsible for a number of high-end UNIX machines with a small pool of potential users. The level of skill required to access the data available was considerable and presented a number of barriers to the wide dissemination and use of the information within the Corporation. The Unit was seen as a back office facility for use in heavily graphical and technological areas of the Corporation and as a result was housed within the Engineering section. The Unit underwent dramatic changes around 1996. There was a major push from within the Unit to broaden the appeal of the service in order to justify the continued existence of the Unit. The second wave of GIS development within the Corporation needed to be a more bottom up approach in order to reach a wider potential user base and place the service within the scope of the normal Corporation employee.

The push coincided with a number of technological developments influential in shaping the Unit as it stands today. Firstly, new Internet/Intranet technology became available to the Unit through software

² Bell, T, Director Central GIS/CAD Unit, Dublin Corporation (16/08/2001) *Pers. Comm.*

developments by Intergraph, the geographic software supplier. Secondly, the Windows environment became an established and more user-friendly operating system allowing simpler software to be installed. Thirdly, disk space became less of a restricting factor in the storage and dissemination of information. Fourthly, PCs radically reduced in price bringing them within the budget of individual users. Finally, the Unit was asked to participate in a pilot of the An Post (the national postal service) and the Irish Ordnance Survey's (OSi) GeoDirectory / address gazetteer³. The Intranet system was launched with a small number of services with basic map display facilities and is still operating within the Corporation today on a more sophisticated level.

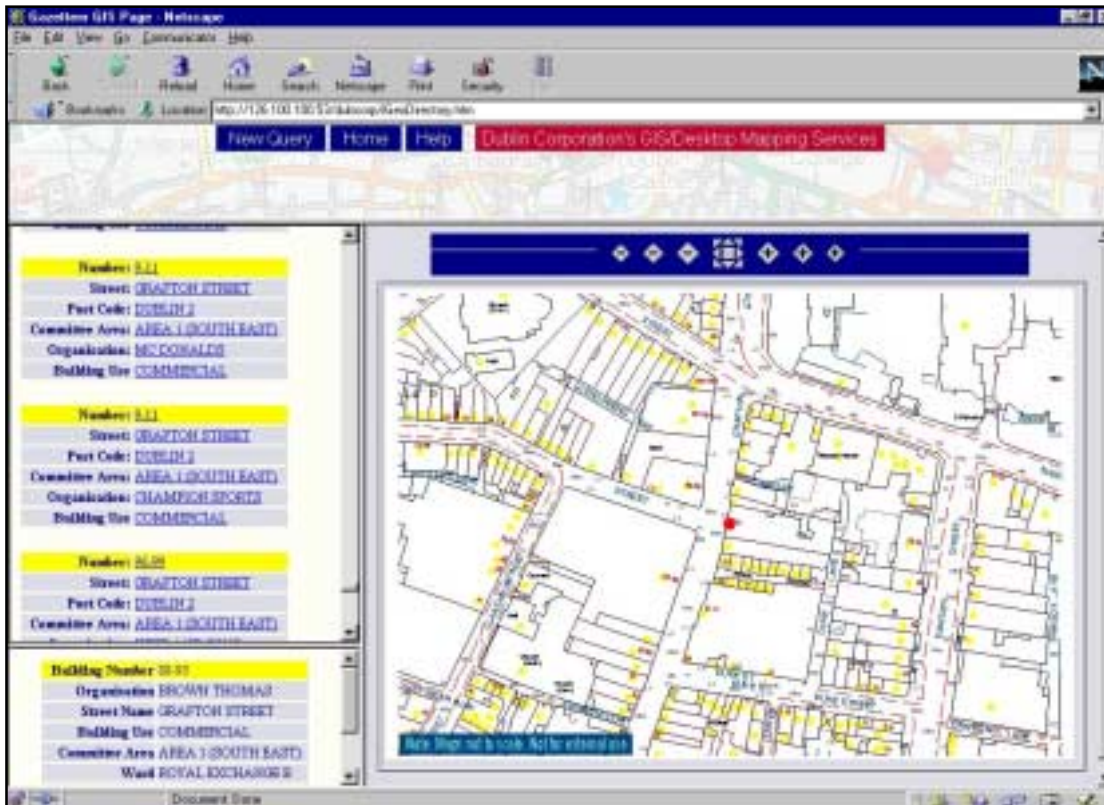


Figure 1: The GeoDirectory Facility available to over 2,000 Corporation staff (Copyright: Dublin Corporation)

At present, the Central GIS/CAD Unit operates a large Intranet service transmitting geographic data to a potential audience of over 2,000 Corporation employees including those in regional offices and in departments like the Fire Brigade. Their GIS Intranet site receives over 700 visits a week and on average

The screenshot shows a search interface with several input fields and buttons. The fields are: 'Street Name: Three Letters Minimum' with a 'Find' button; 'Building Number (optional)' with a text input field; 'Organisation/Business' with a 'Find' button; 'Building Group Name' with a 'Find' button; and 'Building Name' with a 'Find' button.

users make 8 map requests per visit. The service revolves around the An Post and OSi GeoDirectory and OSi background vector 1:1,000 mapping (Figure 1). At its most basic level, the Intranet service provides Corporation employees with the ability to search by address, building, company name or street and produce a map using an address point as the centre point (Figure 2). Users are also able to pan, zoom, redline, copy and print the maps. Currently, the unit provides 17 distinct datasets, as well as the GeoDirectory service (Figure 3) and also hosts interest group pages and GI associated links.

Figure 2: Possible queries (Copyright: Dublin Corporation)

³ Bell, T, Director Central GIS/CAD Unit, Dublin Corporation (16/08/2001) *Pers. Comm.*



Figure 3: GIS Intranet Service Homepage (Copyright: Dublin Corporation)

Most of the datasets distributed on the Intranet service are overlaid on the basic GeoDirectory facility. The location of underground pipes (a Drainage Department database), road restriction markings (Roads and Traffic Department) and telecom ducts (Road Maintenance Department), for example, are all shown in separate utilities within the corporate Intranet. In some cases, users can also query the databases via the reference number or facility name (e.g. the Office Locator facility), (Figure 4). The majority of the datasets available to the GIS Intranet viewer are within the traditional domains of GI such as Planning, Surveying, Drainage and Engineering.



Figure 4: The Office or Facility Locator; an example of further query types

The Intranet service is available to all networked PCs either via a system called Metaframe, a thin client technology or NT networked machines. Metaframe is used to farm out the services normally executed on local PCs. Microsoft Office, local database management systems and other software are housed in an off site location and the local PC then makes contact with the off site farm in order to carry out the software requirements for the local PC user. In this way, much of the processing is done in another location resulting in less specification requirements for the local PCs. This in turn requires a less sophisticated, cheaper terminal with lower memory demands and allows for easier centralised management of desktops.

Metaframe has expanded the GIS Intranet audience dramatically and has opened the service to input from the more administrative areas within the Corporation (e.g. the Central Claims Unit). The Housing Department has recently assisted the Central GIS/CAD Unit to develop a mapping utility for the Corporation's housing stock. This facility is an example of a primarily administrative Department becoming aware of the service through Metaframe and realising the potential applications within their own realm. Presently the service is available on a pilot basis and will be rolled out to more users when the pilot is concluded.

The implementation of a Corporation Extranet is still in the development phase but plans are being considered to offer the GIS Intranet service on a mobile basis in the future. This would increase the physical accessibility of the service to more remote locations for Corporation staff and would allow a dial up connection over a dedicated leased line to connect to the service without normal time restrictions of working hours.

The future potential of the service is exciting but at this point in time it is severely limited by a number of factors. Firstly, no spatial data queries are possible and users have to resort to the original data in order to do simple spatial analysis. Secondly, there is a relatively long development time lag in getting the services up and running. A number of services have had to be abandoned because of lack of interest in updating and further developing the service once the initial pilot had been implemented. Due to the small size of the unit (two officers are involved in GIS operations and one in management), securing the momentum of the project by providing the required support and promotion for these innovations is a difficult task. Thirdly, the main factor preventing access by members of the Corporation to the service is lack of knowledge of its existence, coupled in some cases with fears that the service is too time consuming to master. The required skills consist of basic browser and mouse proficiency and the ability to follow hyperlinks. Although these may seem simplistic enough, even these basic skills can be prohibitive in getting users to access the geographic data that the service provides. The European Computer Driving Licence (ECDL) has been adopted widely within the Corporation and has helped promote the GIS Intranet service through the increased level of IT literacy of Corporation staff.

In direct contrast to the Intranet, are the services available over the Corporation's external sites⁴; little geographic information is available to the Corporation area inhabitant or the casual viewer. Among the notable exceptions to this are the parks map⁵, a map of waste bring centres⁶ and the virtual Dublin tour maps⁷. The Parks Section within the Corporation in conjunction with the Corporate Services Department has made maps of the city's parks available. The maps are displayed as image files and are not geo-referenced. Users are presented with a small image map of the Corporation's area divided in administrative areas. Users are then asked to click on the area of interest to get a more detailed image map of the area. The waste bring centre map is also an image map and when the user clicks on the red dots representing the waste bring centres in the Dublin Corporation area, a popup window with the details of the centre (such as opening hours and type of waste accepted) appears. The virtual Dublin tour is an image map of the city divided into sections leading to a more detailed raster map of the section selected highlighting tourist amenities. Little user interaction with the maps is permissible. The lack of information provided is in part a reflection of the number of restrictions faced by the Corporation and in part by the early stage of IGIS implementation in Ireland. Only a small number of Local Authorities have reached the Internet mapping stage of the LGCSB strategy for GIS development in Local Authorities (LGCSB, 1999).

⁴ (<http://www.dublincorp.ie>)

⁵ (<http://www.dublincorp.ie/parks/maps.htm>)

⁶ (<http://www.dublincorp.ie/wasteinfo/index.htm>)

⁷ (<http://www.dublincorp.ie/visitor/index.htm>)

Preparations are, however, underway by the Central GIS/CAD Unit and the planning department, at the time of writing, to produce the 1999 development plan in CGM format for the city. This has obvious benefits over the previous geographic information offerings currently available. The ability to zoom and pan within the CGM file and redline is available. This development is in response to a similar undertaking by the Dun Laoghaire-Rathdown County Council, which is currently available at <http://www.dlrcoco.ie>. The potential of the Internet for public consultation and dissemination of public information has however been recognised and it is very likely that the Internet will be used in conjunction with current information dissemination methods to improve interactions with citizens.

The Limitations: Problems facing Irish Local Authorities when using Internet and Intranet based GIS

The limitations facing Dublin Corporation and other Local Authorities in Ireland are numerous. Firstly, there are the technical and organisational issues associated with the introduction of new technologies for information management that one would find in any organisation. Most of the work carried out by the Corporation is ongoing and very few databases are not undergoing continuous change. At the moment, the mapping is static and updates while carried out on a daily basis in most departments are not immediately and as such the maps tend to be outdated within a very short time span.

Secondly, complying with copyright legislation and data protection whilst maximising accessibility under FOI places quite severe limitations on the Internet mapping component of Local Authority IGIS not experienced by potential Intranet audience. For example, the general public are not privy to the same level of information exchange as employees within the Corporation. Furthermore, due to restrictions placed on high quality vector maps by the OSi, neither can the highest quality maps be employed. Until very recently, the OSi did not allow any vector maps to be transmitted over the Internet. The associated benefits of scalability and better representation of information were denied to users on the basis that the OSi would lose revenue through the private (or institutional) downloading and printing of the digital maps. However, this problem while not fully resolved has been overcome to some extent by the use of the CGM format, which does provide a limited vector mapping facility over the Internet.

Thirdly, the Internet, while increasing in popularity is still an elitist preserve. Not all inhabitants of the Local Authority area have access to the technological hardware necessary to connect to the Internet and not all inhabitants have the technological savvy to use the Internet. These barriers can mitigate against sectors of the community already defined as socially excluded, and only serve to enhance their isolation. Ironically it is these very groups that are often the most dependent on Local Authority community services such as housing.

Conclusion

The Internet is likely to play an increasingly important role in the dissemination of public information by Local Authorities both within the organisation and to the public. Steps have already been taken to avail of the advantages of easier manipulation, processing, transmission and storage of the increasing amount of digital data. These advances may result in increased citizen participation and greater citizen democracy within the Local Authority area and possibly a more informed population and improved decision making within with regard to planning and other activities.

However, several barriers still exist to the Internet becoming a medium for information transmission. For example access to the technology itself ensures that it is unlikely that the Internet will ever replace Local Authority counter services for some socially disadvantaged groups. Copyright and data ownership also continue to play a major role in determining the type and detail of data available both to the public and within the organisations.

This paper has looked at developments in Dublin Corporation; however, this study is part of a larger project that will be continuing over the next three years to chart and evaluate the use made of the Internet and Intranet by Irish Local Authorities as a means of improving local governance and increasing local democracy and participation.

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