

Implementing Enterprise GIS Portal

Hsin-Chih Li

China Engineering Consultants, Inc., Taipei, Taiwan

Abstract

The GIS portal is a mature concept. Enterprise superintendents need to identify the explicit objectives and use of an interior GIS portal before building one, especially if the company plans to provide professional services to a large number of users. Development of an enterprise GIS Portal has several restrictions. The portal toolkit sets up metadata and map viewer services to satisfy staff of different fields across the enterprise. However, not all spatial data can be accessed and downloaded on the portal. The most difficult task is how to persuade and prove the value of an enterprise GIS Portal. The GIS Portal can integrate with the enterprise MIS and Knowledge Management system. This article introduces the establishment process of an enterprise GIS Portal.

Key Words: Geographic Information System (GIS), GIS Portal, GIServices

1. INTRODUCTION

For an enterprise, Spatial Information is the data always to be pressed for assignment, especially when multi-users have different purposes in the whole enterprise organization; you never can imagine the scope of data items users want, so that you will always be treated like a call center from other departments to ask for help, just because you have some spatial data fortuitously or ever take full charged of GIS projects. When the answers can't satisfy the colleagues (especially need to wait for many hours or days for a simple question), the enterprise starts to cerebrate the significance and the role of GIServices in the organization, consequently to find out the spatial data sharing is the minimal requirement. Then new questions were appeared after they became to share data from GIS server, the colleagues still didn't know where the data catalog, how to access and how to treat them; therefore, this demand of spatial data regard as "customer services" to fit enterprise's IT system. As the process of an Enterprise Information Portal(EIP), the initial stage is to think over

the service mode and administration domain, however; the most important thing is what GIServices can provide within the Enterprise and, is it worthwhile.

2. REQUIREMENT

Before get into internet service, you need to think about what colleagues really need. In past, there were some services similar to GIS FTP server on Intranet, while most enterprises started to develop the enterprising GIS portal. Fortunately, we have many GIS projects and experiences from outside customers, carries on the way and the strategy regarding the user demand, may have familiar tasks and handle them with ease.

First of all, the enterprise needs to analyze characters of interior users and outside customers, it can be separated to observable demands and potential demands. The observable demands can achieve by discussion meetings, user conferences and sales static, however; what is demand of potentiality. When a company have thousands employees and uncountable branches, it's difficult to find out the answer, even from the interview of senior manager since they are so busy for this and have lack of knowledge of GIService. Then who we should ask, the best departments are relating to business, research and library units because they are the organization who really feel the pressure of interior of enterprise. Enterprise can make all of department into two panel discussions which one is directly business units, mainly take full charge of projects from outside customers. In a civil engineering company, project-oriented departments are such as transportation, construction, harbor, railway and highway departments; the others are supporting units such as administration, library, research & development and computer center.

The requirements of first group are clear and much. Most interesting discovery is from to library, there are many people borrowing map from there and really hard to imagine how much paper to be wasted. Engineer use paper adroitly since field exploration is requisite but using GIS is out of practice for them, many papers are destroyed because of carrying, then next users need to buy a new map. The cost of maps is higher than using digital map. Second, the engineers never know map is already renewing because they always look those maps as books and no responsible

GIS unit in the enterprise to satisfy what they need. The other problem in engineer is less knowledge of map and spatial concepts, such as scale, coordinate system, theme maps and data precision. It's quite hard to discuss with library unit but the adventure is the system know who always come to ask question, what kind of question, what kind of map they need and those problem can't be solved.

The business or administration units are another amusing; they hold the information about customer list and market distribution, also realize the country development tactic in the future. The difference between enterprise and government is that enterprise don't have the scope of market surely guaranteed, it means no one can guarantee where the next project is and what the potentiality demands are. Business & Administration Departments own the scope of possibility of market, opportunities and type of spatial data they require. Another advantage is that they always have directly negotiation with the highest managers.

The second stage of interview is to focus on middle level of managers or section chiefs, they contact with customers directly, provided the advices of insight ideas, schedule and technique skills. For example, the stage of project's proposal sometimes only to have month-long preparation time, besides the topography maps, possibly requests more spatial data such as landscape, temporal-spatial change or 3D animation. After realized what is demand of enterprising GIS portal, the next stage find support of demand, establishes GIS portal maybe cost millions of dollar, for business owner, seeing real income is quite possibly important, if GIS tool is the mainstream of the enterprise, such as bodyguard company, the estate company, utilities Corporation, then establishes the portal would be able to accept, but when the enterprise is does have the explicit purpose, the portal concept is very difficult to persuade senior manager's heart.

There are three key factors and the strategies in implement GIS portal, the first key is how to get the support from senior managers, it can starts from the prototype portal with several basic functions and try to guide the functions in the enterprise. Then, take user-log to persuade the senior managers again. Next is the budget control, the expense must not over because the manager can hardly endure it. The last joke is that exaggerate your business competitor get great help from system.

Second factor is the response of enterprise interior customer, regards your colleagues as yours exterior customer, holds the conference, provides training regular, and integrate with enterprise knowledge platform, strives for the support from technology manager. Third is use skilled GIS tools and establishes versatile spatial database, the portal can't occupy the power of enterprise competition; the GIS warehouse must establishes in the shortest schedule and the less funds. Under this condition, the enterprise can consider the opportunity to establish exclusive GIS Portal.

3. ENVIRONMENT

The enterprise need a good network foundation to develop GIS portal, it would be better if it already have enterprise portal so it will save time and become convenient. The basic of portal is a network authentication environment because each item of data and serves are consist of several servers, therefore the single-signon can help users to access enters portal, may know computer segment IP, the status and the jurisdiction, each jurisdiction also have been authenticate in portal at the same time, each web form in portal also has the rigorous XML Encryption Requirements.

Moreover the enterprise had to develop knowledge platform and the knowledge base, it's not difficult to lead the colleagues to use knowledge platform because it's usual during work, next is the knowledge base saves many space keywords but those information were distributed in different storages which is lack of connection, especially when there data can link to the spatial data. If there is one authoring platform to attract more engineer and project managers to access attention to exchange spatial information and provides the content through the Internet.

The third portal implementation is the extent of enterprise computerization, such as good computer equipments, the data Remote Replication & Disaster Recovery, the high speed network (some PCs equip with GIGALAN), the high Human/Machine rate (>1), GIS software sharing and files server for each branch and so on. So, it only to buy a Web GIS software, certainly it would be more convenient to increase one spatial data engine or image express server.

4. DATA

Enterprise GIS portal provides the services all revolves around the spatial data, most important thing is establishes Geo-libraries which conform the enterprise demand. The spatial data source comes from the government, data agent or the enterprise exclusive data such as different scale of topographic maps, aerial photos, geological data, ecology investigation maps, noise restrict area, urban plan map and so on. The enterprise need to license or copyright of each item to guarantee the data is legal in whole enterprise. The popular spatial data purchases from the commercial market and government with a long-term contract, and sign the merchant evaluation maintenance routine contract to government, and take the digital map in first priority. For example, the enterprise for different tasks need to prepare 1/1,000,000, 1/25,000 and 1/5,000 scales map for entire market area, and the large scale 1/1,000 topographic map can match enterprises majorities project's area. Most vector data provide 2-3 formats such as DWG, TAB and SHP in database to satisfy different application. The most difficult part is enterprise's paper map or design drafts that store more than 20 ~ 40 years, maybe these map can be scanned to digital images and build their spatial index.

Another kind of large amount data are images which divides into the satellite image and aerial photos, considered factor including space resolution, cover area and renewal frequency, if the enterprise doesn't have certain business area, seeking low resolution and cover greatly satellite image is the best choice. In Taiwan, choose SPOT (6.25M Resolution) as the entire island image scope and renew every each 3~4 years, expect to have the historical images and compare between alternative uses of land environment monitoring and land utilization vicissitude. Usually engineers need the fast way to purchase aerial photo from government or commercial company. The enterprise also can build spatial index of aerial photos, when data can't find in spatial database and someone apply it, GIS portal server will remote download from commercial company into data bank fast.

The third kind of spatial information comes from enterprise restricted data but each enterprise owns their restricted data, the data circulation and secure request are also different. For an estate company, the houses and land information are low

securely, however; for the civil engineering or utilities company, to establish the spatial database possibly to manage on has strict is necessary. But in any case, the enterprise in carries out in the service will produce many precious spatial data, without any doubt every department cannot properly preserved material lose the precious property. Another advantage in GIS portal is the enterprise is short of the crosswise connection in the departments, each department doesn't know spatial data are produced or collected in the other departments, only establish the data catalog and publish rules to reduce the data duplicate and the investigation fee. Settles the old projects' data is laborious, the data forms surely have many formats and without geo-coding processes and integrating, in order to solve this problem, the enterprise starts to setup standard format, tool and graphic entities, form design drawing to the historical images.

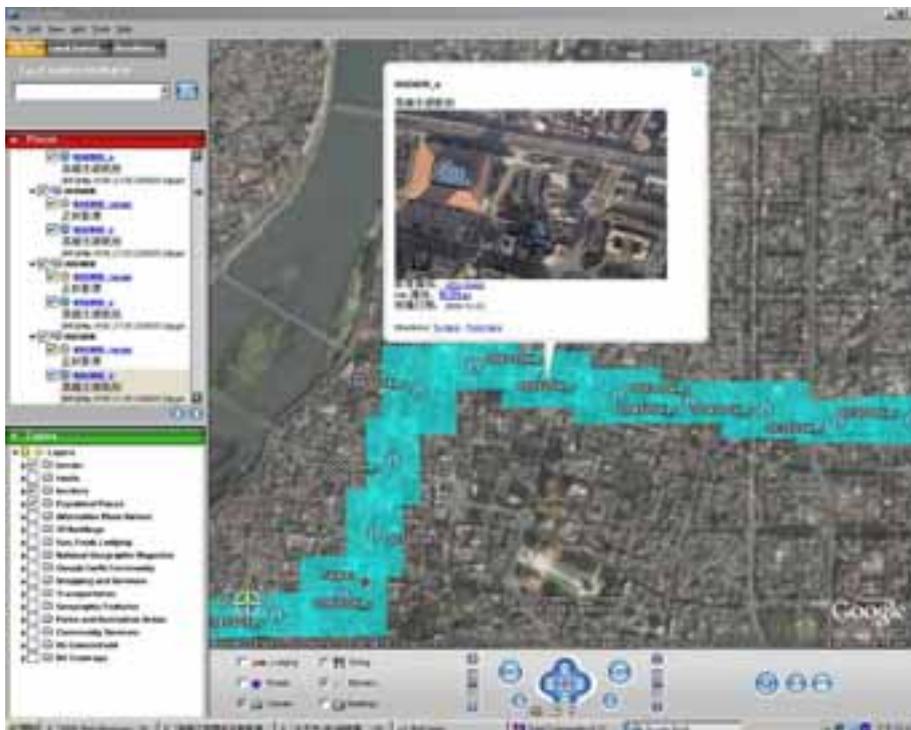
The data management is another topic for the enterprise, each item of non-innate data should extremely careful about the copyright, the right of data use only restricted in the interior of enterprise. If must provide the add-on spatial data, it still make a payment to the original company. The member of enterprise need to sign the privacy statement before touch database, and spatial data add some marks or watermark. Each item of data application has quantity control, if surpasses the need or the quantity of plan, the portal will inform the manager to realize the purpose immediately.

5. SERVICE & TECHNOLOGY

The final work of GIS Portal is provides services in Intranet network, there are some services to be as follows.

- (1) GIS bulletin board and web links: Provides the GIS/CAD software news, including patch information and download services, the useful and visitable websites will have quick link in first page. Next is establishes the spatial information group in the knowledge community of enterprise, the colleagues can have the discussion and exchange spatial data information.

(4) Web map service: Provides the map search and browsing service, sometimes engineer only need to catch a map information, downloading data sometimes takes time and is not artistic, the web map services provides the chart level wrap just need to copy & paste to satisfy simple need. Recently, we also find out that Google Earth can establishment aerial photos index.



(5) The extra value service of data: The advantage of enterprise portal is the software sharing which develops applications for image processing tools, data conversion tool, contour and grid transformation tool, the project reference tool, 3D

fly-through tool on the servomotor.

- (6) Enterprise knowledge base: GIS portal can provides the customer and the supplier spatial data, settles the project master plan in spatial, to carry on the engineering data (road, railroad, high-speed railway, science park design and so on) to make the enterprise interior personnel to see other departments carry on the engineering design position, they may use the portal exchange in the data share with each other. On the other hand, the enterprise may use the portal regarding the fleet position and mutually support.

The GIS portal technology is not high of enterprise demand, compares with their customer's data warehousing and portals, except web GIS, spatial data engine, the enterprise doesn't need extra purchase. In the most enterprises, RDBMS and knowledge platform has been ready and GIS portal will be reach easily.

6. CONCLUSION

CECI is the largest engineering consultant organizes in Taiwan and serviced in several countries. In past, development of GIS only for provides one solution in engineering projects, after nearly 20 years development, CECI has established many GIS application and database for government in island. After the pursue customer satisfaction, we find out the most needs of GIServices is our enterprise. CECI already has preliminary GIS portal and a preserved each rich spatial data in the organization with smuggled project experiences and technology in foreign country, for sure enterprise's GIS portal will become the resources of competition.

REFERENCE

- Alameh, N. (2002) Services chaining of Interoperable Geographic Information Web Services, <http://web.mit.edu/nadinesa/www/paper2.pdf>
- ESRI, 2004, GIS Portal Technology, ESRI White Paper
- Gunther, O., Muller, R. (1998) From GISystems to GIServices: Spatial Computing on the Internet Marketplace, in *Intermediaries for Information Services*, Humboldt-University of Berlin, pp195-211
- Liang, S. H. L. (2003) A Distributed Geo-Spatial Infrastructure for Smart Sensor Webs, FIG Working Week 2003, http://www.fig.net/pub/fig_2003/TS_13/PP13_1_Liang.pdf

- Longley, P. A., Goodchild M. F., Maguire, D. J. and Rhind, D. W. (2001) *Geographic Information Systems and Science*, New York:John Wiley & Sons
- MacEachren, A. M., Kraak, M. (2001) Research Challenges in Geovisualization, Cartography and Geographic Information Science, Vol.28, No.1
- Peng, Z., Tsou, M (2003) *Internet GIS – Distributed Geographic Information Services for Internet and Wireless Networks*, New Jersey: John Wiley & Sons
- Tao, V. (2001) Online GIServices, *Journal of Geospatial Engineering*, Vol.3, No.2, 135-143
- Selwood, J., Tang, W. (2003) *Connecting Our World: GIS Web Services*, California, ESRI Press
- Selwood, J., Tang, W. (2003) GIS Web Services: A Route to Societal GIS, Map Asia Conference 2003