THE MAINTENANCE & ARCHIVES OF THE DATA IN GIS

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Abstract

At present, GIS technology has been successfully used in many disciplines. After the great efforts for many years, the technology of geographic data capture, mainipulation and analysis is getting mature. This paper is to study the maintenance and archives of the geographic data in GIS. It is because that the geographic data has some distinguishing features which differ from the other data, such as the interrelation, multi-dimenision (x, y, z and time) and etc. The problem we are facing more serious is the efficiency of management, storage and archives the geographic data in database which is one of the link in GIS.

Background

GIS reasearch and application in China was started in 1980's, and now is moving from research and development into practical application and industrialization. The establishment of National Land Fundamental information System of China was started in 1986, which includes geodetic database, gravity database, topographic database, and geographic names database. In order to improve the National Land Fundamental Information system, 1:250000 topographic database was stared in 1993 and is expected for completion in 1997. Recent years, some regional Infomation Systems have being established, such as 1:250000 Land Resources Information System of Liaoning province, the 1:50000 Land Information Database of Hainan Province, and some cities and urban management and planing databasesin special econmic zones. Some thematic databases have been set up one after another in the departments of Transportation, Agriculture, Oil fields, Forest, Geology, Water conservancy, land administration and ect.

NBSM's future lies in its ability to populate a massive database with a "data warehouseing" archtecture. It is the responsbility of NBSM to management, dissemination and service for geospatial information for its users of 21st centry. NBSM should offer the 3-D carrier, for all the spatial data which collected on different projections, scales and purposes with the related data can be co-reference each other.

Keeping the Geodata updating

To keep database updating is one of the functionalities of the database maintenance. Throughtthe geospatial data community, traiditional digital data sets are being examinedto determine with what reliability they can be used for a variety of information needs. For geometric data, the efficient wayis used the remote sensing image or areo-photoes as the data source to

extract the changing features depending on how much datail the users are concerned, and add the attribute information (economics, cultural, sociology and history) from various chanels(administrative reports, news summary, data exchange, field check and etc). GPS is a good data souce, too.

To keep the database updating also need the new technology, spatial data manegement system to support the data process. ArcStorm (ArcStorage Manager) is one of the new software technology for spatial data management which adopted the Client/sever architecture. The ArcStorm servers are a set of programs that control access to ArcStorm database, thus ensuring data integrity and security. Concurrency managementis doneby locking.Concurrency is the accessing of the same data by many users. When a transaction is started, a lock occurs on the selected coverage features and on related records in external attribute tables when that feature is selected for update purposes. No one else can update those features until the transaction is ended and the feature unlocked. The set of selected features is locked prior to extraction from the database. The feature and its related recordes are still open for reading. ArcStorm provides the ability to maintenance of feature history (cartography and attributes) by meansof recording the histry of the database for given point in time.

Query and application

NBSM produces several kinds products mostly are analog products right now. For the digitial data, such as the 1:1m scale DEM, 1:1m cartographic database and geographic data, employed a quit simple database approch in which location of media and minial descriptive information about the data set is related on-line. Distribution these data sets is on standard hard media: 9-track magnetic tape, 8mm cartridg tape which are distributed either in initial quantity through the inital distribution unit or according to the certified request.

To implementthe idea of "Information Highway" in dsitribution of Geospatial data, a gateway interface allows the actual handshake between the producer or the holder of information and customer or the requester for that information. The interfeace rides on electronic network backbones and services as a network geospatial information exchange using appropriate and standard communication protocols. The customer will access the interface gateway by their access provilege, security level, pertinent data/product requirements, amdlevel of expertise. Another consideration is hardware and software plateforms. It is needed to develop converter or a translator; and a standard data exchang models. Prior to accepting records for the Archives, information appraiser analyze data for historical value. There are a number of steps involved in accepting materials for data holdings. First, data is validated. Customer have to compare data in the databas to documentation to make sure customer get the right records. If it all matches, customer then undertake the physical preservation of the data. The only validation procedures customer have for spatial data are through a GIS. The best way to determine if customer are really looking at data.

Archives

For such a mount of investment, the goal is not only satisfy with the current needs, but also with the needs for the future.

The advanced technology offered us an opportunity to make a dynamic record for the changing globe. It is the weath of society for the

development of the mankind. From the historical point of view, it is important to give an enhancement on archives of Geospatial data which has some distingishing features, interrelation (spatial and non -spatial), multi-demention(x,y,z and time),plateform dependent (hardware and software). The problem facing us is that we could not archives the hardware andsoftware to gether with the data. Changing technologies encourge re-engineering. New generations of hardware have attained 18 month cycles and sophistication of sofware and application programinterface is mating or exceeding that pace.

There are two ways to deal with this problem in resent days,one is making a converting interface to migrate the database to suit forthe newsystem (new hardware and software version). For small area or small amountsof data, this maybe a solution. But for large area anda great deal of data, it is not an efficient way. Another wayis to considera standard exchang format such as STDS which will be convenience for transfer of spatial data among the disparate Geographic Information Systems and share the data products outside the agencie.

To keep the archives of the spatial data in such format, the researchers in the future will be able to recreate the relations from the archives for their study. Oneof the advantage of standard format is independent from the hardware and software, and relatively stable. Althoughwe use the current GIS technolog to analyze the data we take into the Archives, the data that is finally preserved is kept in a software and hardware independent format. That maybe the waywe can preserve data across time. We can't always expect the technology of today to be available a hundred years from now. As if the preservation of information for the current generation isn't difficult enough, we must be mindful of data availability for generation to come. With this cooperation and sharing, it's easier for the Archives to acquire data and preserve data for the future. Archives system is still in its begining phases. We think GIS is flexible enough for us to establish archival control over spatial data.

References

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