

## An Example: The City of Berlin

### FIS-Broker Geo-Data Management

For a long time, geo-information systems (GIS) were experts' systems whose application was reserved to only a few specialists. However, technical developments in hardware and software as well as in data collection and evaluation (e.g. long-distance research), have increased the demand for spatial information and analysis systems, on the basis of which spatial data could be processed. As a rule, a geo-information system is a system of hardware, software and applications with which spatially referenced data can be collected, managed, analyzed and presented. Thus, due to the spatial reference of its data and its specific processing methods, a GIS is fundamentally different from other information systems.<sup>0</sup>

In municipal planning, but also in business, there is an enormous potential for optimizing planning and decision-making by means of geo-information. Almost 80% of the municipal data stock is of a spatial reference.<sup>0</sup> The empirical information indicates that there is a considerable unmet demand for spatially-referenced information. About 17% of the market potential is estimated to be incompletely tapped; 83% is entirely untapped.<sup>0</sup> Local and state governments are major data producers. A variety of geo-data, e.g. such basic geo-data as the Automatic Real-Estate Map (ALK), the Authoritative Topographic Cartographic Information System (ATKIS), or specific scientific geo-data, are produced, maintained and made available by local and state governments. The equipping process with geo-information systems has progressed quite differently in the states and at the local level, and has been marked by the historically developed heterogeneity of their systems. Often, non-standardized, incompatible interfaces of the GIS products and other application programs used have hampered the exchange, the multiple use, the free publication and the marketing of the geo-data. In this context, the term "spot solutions" or *monolithic geo-information systems* is often used. In the following example, *FIS-Broker*, of the Berlin Senate Administration for [Urban Development \(SenStadt\)](#), is to be introduced as an example of modern geo-data management that builds on structures which have developed heterogeneously, and makes them effectively usable for the administration.

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<sup>0</sup> Liebig; Mummmenthey 2002 p. 7

<sup>0</sup> Malzahn, 1998, p. 103

<sup>0</sup> Fornefeld; Oefinger 09/2002 p. 68

## The Heterogeneous Systems in the Berlin Administration

The Senate Administration for Urban Development (SenStadt) covers a large range of responsibilities, and is composed of the sections Urban Planning, Construction (including surveying), Transportation, and Environment. Within *SenStadt*, geo-data are collected, updated, processed, and passed on to the public for private and economic purposes on a large scale. A wide spectrum of data stocks exists within SenStadt, heterogeneous with respect to data format, scales, coordinate systems, spatial extension of the area being observed etc. As in other municipal administrations, specific GIS and other application systems have been applied in the various areas of work for recording and processing geo-data, depending on the task at hand. The first approaches toward an efficient geo-data management system, in which integration into a uniform central system became a priority, failed because since regionally and technically specific GIS solutions had already been established.

This systemic variety, which had grown up over time, had the disadvantage that, due to the lack of logical compatibilities and non-standardized interfaces, basic data had to be entered manually, data were maintained redundantly and data interchange between different systems was restricted. The geo-data produced in the course of work was passed on only to a limited degree. In the final analysis, the available geo-data resources were used only rudimentarily, although the need and the demand for these data increased steadily.

To solve these problems, a conceptual revision of geo-data management was undertaken in 1998. In the context of the Berlin-wide integration project "*VEZUDA*," the goal of which was the standardization and unification of the various data structures of the Berlin administration, the project "*FIS-Broker*" was initiated as a part of the information system "*City and Environment*" at the beginning of 1999. "*FIS*" indicates that the information system is to take data available in the administration and make them usable interdepartmentally.

A central component of the FIS-Broker is interdisciplinary data query by means of a [metadata information system](#). A data catalogue (repository) contains all important information needed to find, understand, present, and process data stocks. The catalogue service contains descriptions of the data stocks as well as technical explanations and details on contact persons. Thus, the user can obtain an initial summary of the data stock, select data specifically and then look at them on the screen. The metadata information system makes the extensive data stock transparent for all areas involved, and thus makes a more efficient usage of the available data resources possible.

The geo-information systems already in use were by no means to be replaced. The basic idea of the FIS-Broker is rather to make all geo-data available for all applications without carrying out a standardization of the systems at the level of the data users and data producers. This procedure has the advantage that the respective strengths of the particular GIS applications can continue to be used

in their specific areas. The data of the suppliers can remain in their respective formats of the data-storing geo-information system (e.g. ArcView, Sicad, Yade), and can also be presented under these systems. By means of an integrated publishing component, the data suppliers are to process the geo-data for their own presentation in FIS-Broker independently, and release them. The original data remain with the supplier, and are subject to the respective security regulations.

The FIS-Broker is equipped with process adapters which make the standardized access to the functionality of these systems possible. This has the great advantage that the data suppliers can design services of their own with the functionality of the systems they use, and data conversions, which may involve information loss, are avoided.

Standard browsers make possible the use of the FIS-Broker on all system platforms in the net, and convey to the user a uniform view of the different program systems and their data formats. In this way, digital maps, which are stored decentrally with different geo-information systems, and which provide differing reference areas, can be published, reprocessed and presented through the FIS-Broker.

In addition to the thematic and catalogue-supported query, the FIS-Broker also enables a spatial query on addresses and spatial units (boroughs, water conservation areas) as well as information on coordinates. The integrated spatial reference service thus makes it possible to find specific information on selected areas. By means of the spatial reference service, spatial connections between different data stocks can be evaluated through the locational reference, so that new knowledge is gained through a combination of information.

### **Advantages of FIS-Broker**

The FIS-Brokers solution makes possible efficient data management, promotes the dissemination of geo-data resources which have not been fully used in the administration, and could be a first step in the marketing of geo-data. The bulk of the geo-data on hand at SenStadt is made known to the administration through the intranet. The entry into the Internet is planned for 2003. Approx. 80 data stocks are currently open to the public from the departments and subordinate authorities. The time-consuming and information-loss-prone conversion to special data formats will be eliminated. The maintenance of data will be considerably simplified, and redundancies avoided. Internet presences, too, will be considerably simplified, since the presentation of the maps will use the available FIS-Broker services (see vacant-lot management.)

The entire Berlin administration already has access to SenStadt's geo-data through FIS-Broker. Other services, such as the internal administrative real-

estate information and statement procedure (*Laus*) and the soil pollution register, are also already working with the FIS-Broker. Furthermore, FIS-Broker is used at the municipally owned Liegenschaftsfonds GmbH (Real-Estate Fund Company). It is also a factor in economic subsidy considerations. Other cities, such as Dresden, already use the broker service.

An interesting practical example, which could be transferred to other areas and municipalities, is the Internet service on *Vacant-Lot Management (BLM)* in Berlin. The BLM, which has been developed in the context of an inter-departmental project team of the Senate Administration for Urban Development (SenStadt) in close cooperation with the Berlin boroughs, uses the FIS-Broker technology to support interested investors in their search for building land. Particularly architects investigating properties on behalf of potential clients use this service, and are then able to address more detailed questions about concrete areas to the borough construction consultation service. This office can then provide more detailed information with the aid of the data base and maps on hand. The Internet page registers about 150 hits per day.

With its concept of system-independence, FIS-Broker complies with the Open GIS Consortium's (OGC) international standards. The Open GIS Consortium is an association of institutions working in the area of geo-information, whose goal is to advance the interoperability<sup>0</sup> of geographic information processing and the integration of spatially referenced information technology into standard IT procedures.<sup>0</sup> To this end, the OGC drafts specifications to support software manufacturers in the development of interoperable products.

Beyond that, FIS-Broker, as well as the entirety of available information on urban affairs and the environment, make a decisive contribution to the free and unhampered access of citizens to geo-information, and hence to environmental information. Requirements of this type are on the one hand based on regulations of the European Union<sup>0</sup> –and upon resulting German legislation<sup>0</sup> – and on the other hand on the UN ECE Convention on access to environmental information and the participation of the public in decision-making in the area of the environment (Århus Convention).

FIS-Broker has been developed in several steps with external companies in the context of a *Public-Private Partnership*. **This means that within the Berlin administration, FIS-Broker is made available free of cost.** SenStadt holds an umbrella license for the State of Berlin, while the company is the owner of the software. SenStadt and the company have equal shares in the copyright.

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<sup>0</sup> Interoperability means the possibility of integrating various data in a single workflow. Uniform semantics and syntax must be provided to the user (Bill; Zehner 2001, p. 141).

<sup>0</sup> Altmaier; Müller 03/2002, p. 104f.

<sup>0</sup> Directive 2003/4/EC of the European Parliament and the Council of 28 January 2003 on public access to environmental information and repealing Council Directive 90/313/EEC (effective as of 14 Feb. 2003).

<sup>0</sup> The German Environmental Information Law (UIG) must be amended accordingly by February 2005.

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### Links

<http://www.stadtentwicklung.berlin.de/bauen/baulueckenmanagement>

[http://www.gis-broker.de/broker\\_prinzip.html](http://www.gis-broker.de/broker_prinzip.html)

[http://www.stadtentwicklung.berlin.de/umwelt/info\\_system/de/fis\\_broker.shtml](http://www.stadtentwicklung.berlin.de/umwelt/info_system/de/fis_broker.shtml)