

Methods of Construction and Resource Management Hierarchical Geodatabase Community Access

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Abstract: Problem of rational construction and management of the enterprise geodatabase. Developed a method of constructing the distribution provided under collective use. Implemented public and private method and algorithm of the resource management GDB enterprises in the establishments of geoinformational products.

Key words: Methods of constructing the geodatabase for collective use, the method and algorithm of the resource management BGD, mission resource optimization enterprise GIS, distributio, GDB, establishment

INTRODUCTION

An important task in the creation of innovative products with the use of Geo Information Technologies (GIT) and GIS is the design and efficient storage and use of Geo Data Bases (GDB) (Nikolaev *et al.*, 2016; Nikolaev and Myasnyankina, 2014).

Theoretical part: In research by Nikolaev (2013), Nikolaev and Titova (2011) and Nikolaev (2006) developed a method and procedures for improving the efficiency of building and resource management GIS in the creation of innovative geo-information products. Taking them as a basis, consider as object of study the option of constructing a hierarchical BGD collective use. The most expedient is the use of previously developed models describing the processes of their functioning and the efficiency criterion of the “performance-cost” (Nikolaev, 2013; Nikolaev *et al.*, 2012; Nikolaev, 2006):

$$E = \frac{B}{C} \quad (1)$$

Where:

B = System performance (flow rate of the transaction)
C = Cost function is defined as (Vertakova *et al.*, 2012; Nikolaev *et al.*, 2015)

Given the general formulation of the optimization problem presented by Vertakova *et al.* (2012), the solution of the problem of effective construction and management of the enterprise geodatabase as part of the information management system at fixed values of the parameters of the environment and cost components is reduced to finding.

MATERIALS AND METHODS

The proposed method of construction and resource management under collective type in the play 1 based on the following scheme and sledovatelno action (Fig. 1). Basic method and generalized algorithm for constructing and resource management GDB enterprises are automated procedures (Nikolaev and Myasnyankina, 2014; Nikolaev, 2013; Nikolaev and Titova, 2011; Nikolaev, 2006; Vertakova *et al.*, 2012):

- Modelling and assessment of parameters of the input and internal output streams that characterize the external environment (procedure-A)
- Shaping the characteristics of the typical processes of Automated processing and Formation (AOF) arrays of GPI (procedure-B)
- Analysis and selection (primary synthesis) variants ierarhicaing structures under the information system of an enterprise (procedure-V)
- Modeling appearance, rational choice of the composition and characteristics of BGD (procedure G)
- Implementation of requirements for the system parameters of the main component of BGD-Information Assurance (IA), Intellectual Support (IS) Software (Software) and Technical Support (IT)-(procedure-D)

Analyze the composition and appointment of the implemented standard procedures of modeling of processes of functioning of subsystems and elements of BGD. A method of creating a geographical information system providing the enterprise consists of the following major program systems and procedures.

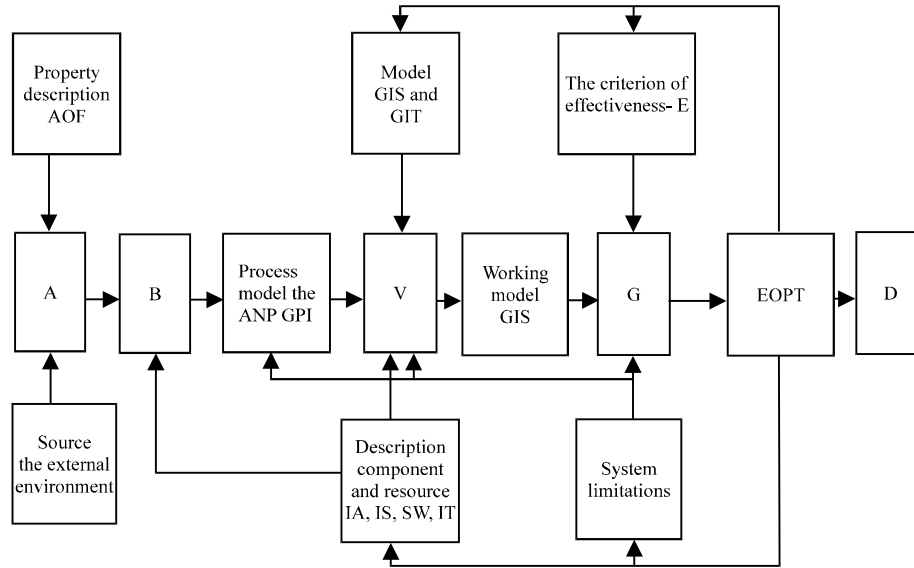


Fig. 1: Scheme of the method and algorithm of constructing and managing resource-mi BGD shared access

Procedure A (program STREAM-A) contains subroutine simulation of heterogeneous input streams applications is transitive aerospace imagery, forming distributions of the level of complexity of the input data arrays for remote areas-mirovaniya of the earth, estimate aggregate characteristics of the flows of requests and requirements from external and internal environment. This procedure is used for simulation of environmental parameters and provides estimates that are initial data for calculation of the characteristics of BGD.

Procedure B (program ANP-B) involves the routine generation of an array of characteristics of the component IA, IS, SW and IT, synthesis routes the processing of GPI, performance evaluation processing of GPI. A source of information for procedure B are the results obtained from procedure A and the number of RAID types GPI, routeyou AOF, possible components of IA, IS, SW and IT and the cost of information resources.

Procedure V (the program of calculation of characteristics BGD collectively, the service) provides the calculation of the stationary characteristics of basic options for building automation systems. The output parameter mi are the average number of active elements on each building level building GDB, the timeout value of the application for each phase of automated processing, converting information to and receive output array of GPI, the performance of the system.

Procedure G provides the process optimization and rational you are-boron composition and characteristics of the BGD.

Procedure D allows to compare the degree of implementation of requirements for the system parameters of the main component of BGD-Information Assurance (IA) Intellectual Support (IS) SoftWare (SW) and Technical Support (IT).

Common for the complex is the local database that provides storing and accumulating output information for each of the procedures as well as specific parameters: the characteristics of the processing objects, the characteristics of the used component IA, IS, SW and IT, the system of constraints. All communication is conducted through the database. For working simulation models of STREAM-A and ANP-B-use modules to generate the distributions of different types.

These procedures provide the versatility of application of the developed models and method of constructing and managing resource BGD enterprises of various functional purposes (Novikov and Nikolaev, 2016; Makarin *et al.*, 2016; Nikolaev *et al.*, 2013).

RESULTS AND DISCUSSION

The results obtained through the use of the above method and displayed in the form of an algorithm are open in the sense of opportunities and further development. That is it is possible to continue the process of further research, making appropriate adjustments such as changing criterion a change of system limitations a change processing object and the parameters of the environment, etc.

Use in the optimization procedure of the hierarchical organization of BGD, of the laws and rules obtained in the previous IP-studies, provides a gradual cut-off is obviously the worst option-tov which reduces the dimension of the array a valid options.

The developed optimization procedure for three-phase resources under collective use is in 2-2, 5 times more bestrode the result compared with the method of direct enumeration.

Previously performed studies on the development of models, allowing you to simulate the external environment and the processes of functioning of subsystems of BGD. The developed method allows to investigate the influence of the composition and characteristics of the elements of the various levels of the building GDB for the selectedtion performance criterion.

CONCLUSION

The developed method of management of resources BGD under collective use taking into account the composition and characteristics of the subsystems as well as the costs of their implementation. The proposed approach and algorithm in the existence from the method of brute force takes into account the peculiarities of the functioning of distributed collective systems for various purposes and allows you to streamline the process of finding solutions. The method developed for this class of systems is in 2-2, 5 times higher performance compared with the method of direct enumeration.

The developed method (construction) the feasibility of the formation of image analysis and rational choice of the composition and characteristics of BGD, taking into account the parameters of the external environment, the characteristics of the OS-the main component of IA, IS, SW and IT. The methods of organization of processing of GPI. This method is implemented in the form of an algorithm and the butt-programmes.

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