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Cloud Services As An Option To Improve The IT Infrastructure Of Production Facilities.

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ABSTRACT

This article presents the results of studies of methodological and applied aspects of information resources management in the context of informatization of business processes in an enterprise. A special place is given to cloud information services and information data protection subsystem as the most important components of improving the IT infrastructure of production facilities.

Keywords: information systems, information technology, cloud computing, business information protection, IT infrastructure.

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INTRODUCTION

In the conditions of transition to the information society, the relevance and significance of the study of theoretical, methodological and applied aspects of optimizing the information infrastructure of the regions, their economic complexes, as well as individual enterprises and organizations [1, 4], increases. In this regard, a special role is given to the study of the problems of corporate information cloud technologies and computing as the most important component of improving the IT infrastructure of production facilities [5].

At present, among the branches of the regional economy, primarily in the agro-industrial complex, these issues have not been studied comprehensively enough, and therefore require their further methodological study and sound practical implementation.

In addition, the problem of informatization of the agro-industrial complex is an important national economic task that faces the heads of enterprises in the agricultural sector, including the heads of farmers' formations. A separate business entity is difficult to solve this task, and most importantly, additional financial costs are required. Meanwhile, a potentially possible way to solve this problem is to connect the PC of farm managers to a separate corporate information cloud for the exchange and processing of data with other peasant farms [3].

In this sense, cloud technologies are a model for providing an information package of network access to a common pool of information and computing resources (servers, software applications, networks, storage systems of knowledge bases, data and related services) that can be promptly provided to users, taking into account minimum labor and financial costs.

MATERIALS AND METHODS

At the first stage, it is proposed to introduce a project of informatization of peasant (farmer) farms in relation to those municipal districts of the Stavropol Territory, which relate mainly to agrarian territories. These are 9 districts, or 34.6% of their number in the region (Aleksandrovsky, Andropovsky, Apanasenkovsky, Arzgirsky, Kursky, Levokumsky, Novoselitsky, Stepnovsky, Turkmensky).

In the listed municipal districts, agriculture is the main industry, the potential for using labor resources is insufficient, and higher unemployment and job vacancies are inadequate. At the same time, there are no energy-intensive processing enterprises, there is no necessary diversity of local raw materials for the development of production and employment. At the same time, the number of peasant (farmer) farms for every 100 hectares of arable land is 1.2–1.3 times more than the average on the edge.

Thus, the design of the collective use of information resources must begin with a typology of rural territorial entities. This will ensure logical justification in the approach to the concept of information cooperation, which in the long term will ensure sustainable development of rural areas in accordance with the Federal Target Program «Sustainable Development of Rural Areas for 2014–2017 and until 2020».

In this regard, it is necessary to segment and package in the created corporate information cloud the necessary production data for these 9 areas of the agrarian direction for the formation and further development of the information content of the agrarian cooperation of the peasant-farming economy of the region.

At the same time, three main known cloud computing service models should be considered and taken into account:

- Software as a service. In this case, as is known, software is provided to consumers of information services and resources as provider applications, implemented within the framework of the established and existing cloud infrastructure;
- Platform as a service. Here, consumers are provided with opportunities for deployment in the cloud-based infrastructure of customer-created or purchased applications that are developed using the service-supported tools and programming languages supported by the provider;

- Infrastructure as a service. It is understood that the consumer is provided with data processing, storage, other computing resources and network capabilities, with the result that he can deploy and use arbitrary software, including operating systems and all kinds of applications.

RESULTS AND DISCUSSION

Currently, there are several advantages associated with the use of cloud technologies [6]. So, access to information stored in the structure of the information cloud can be obtained by anyone who has a computer or tablet, or any mobile device connected to the Internet. This implies such an advantage as the mobility of the use of information resources. Indeed, in this case, the user does not have a constant attachment to one workplace. At the same time, specialists from any geographic location (including workers in the agricultural sector) can receive reports and other documents, and business leaders can exercise proper control over production and make optimal decisions in a timely manner. This predetermines the increase in responsiveness to all production deviations and allows you to set new business goals.

Efficiency as a quality property of the information cloud also has an undoubted important advantage - this is a reduction in cost. Namely: specialists of peasant (farmer) farms do not need to buy expensive, large in terms of computing power computers and software applications. In addition, there is an opportunity not to hire specialists in information systems and technologies or in servicing local IT systems.

With regard to such advantages as rent, the user can purchase the necessary package of services only at the moment when he is really and really needed; at the same time, payment is made only for the variety of acquired functions from the software application and the ability to connect to the information cloud.

In addition, the flexibility as an advantage of the corporate information cloud is that all the necessary resources are provided by the provider automatically according to a previously concluded contract, while at the same time, if necessary, you can make certain changes. It is the high technological effectiveness of a cloud system that predetermines its computational capacities that are rented, made available to users, and if necessary, you can use the base for storing, analyzing and processing information data.

With regard to reliability, independent experts argue that the reliability that modern cloud technologies provide is much higher than the reliability of ordinary local resources.

One of the options for building cloud information services for the developed software model as a service provided is the development of an information and analytical resource for substantiation and selection of specialized activities of producers of agricultural products [2].

The developed service information resource provides the user with various services, including: a space-time oriented analysis of the development of agrarian production in the region according to multi-criteria parameters in the context of rural municipal territories.

In our opinion, the example of the developed information and analytical resource is also applicable to informational cooperation of farms, which will significantly improve the efficiency of this resource by the example of a new type of cooperation being introduced by peasant economic entities.

On the other hand, the transition to cloud computing has recently been increasingly viewed as an option for optimizing the IT infrastructure of enterprises. However, many companies fear that such a transition would create a direct threat to the security of confidential data, both in terms of their integrity and in terms of operating safety. Fears cause technological, legal, and psychological aspects [4, 7]. Therefore, the issue of safe and reliable information storage is becoming increasingly important. In addition, this is due to the fact that at present, with the development of e-commerce and electronic markets that have access to mass communications, the possibilities of unauthorized actions related to the use of processed and accumulated information in the system of digital cooperation of farms have significantly increased.

And, it means that the cloud storage of these farm enterprises can be equated with the neck of confidential information. To implement its protection, the general structure of such a system may include both existing and additional software and hardware tools for protecting production data. From an architectural

point of view, the ideal model for the organization of cloud storage for farm enterprises is one large fault-tolerant secure server, but the cooperative information cloud is a separate subject area in the data storage, and farmers solving specific tasks have access only to it.

At the same time, the question arises of protecting the virtual environment from external factors of unauthorized access, since confidential information from the network interface of a single physical server can go to different virtual environments and information subsystems. One of the most reliable ways to protect corporate farm information is its unique encryption. Currently, there are a large number of different algorithms for protection against external unauthorized access. According to the results of the analytical review, one of the methods of using encryption in the cloud storage is proposed (Fig. 1).

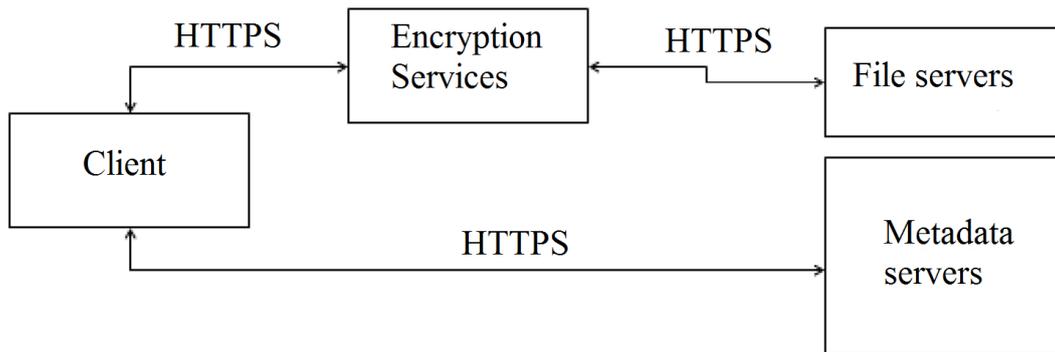


Figure 1: Cryptographic Transformation Model of Cloud Information Storage Services

The proposed subsystem for protecting farm information is based on the use of encryption. The software module includes the software implementation of the Russian block symmetric cipher of the «Kuznechik» type, which is described in the new standard GOST R 34.12-2015. Cooperative information farm cloud storage can be represented as a set of specialized databases that store production, legal and necessary analytical information Fig. 2.

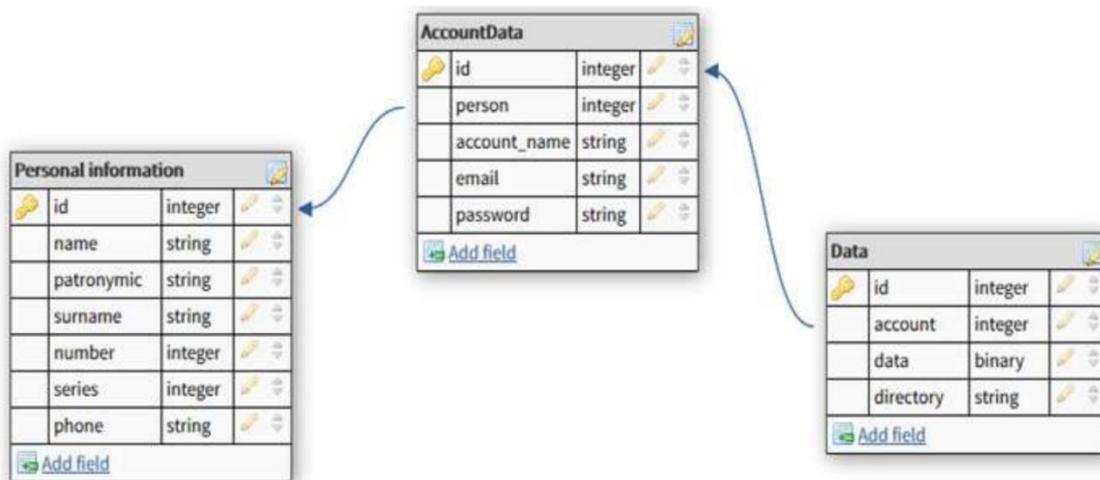


Figure 2: Generalized database schema of the cloud storage of information resources of farms in the region

The new block cipher is based on the use of the SP network, it has 10 rounds of conversion and an increased block length of 128 bits. The basis of the SP network is the division of each round of cryptotransformation into a linear (L) and a substitution (S), which defines a non-linear transformation. The process of operating a software implementation contains the following steps:

- input of initial parameters;

- choice of encryption algorithm;
- choice of cryptographic transformation;
- encryption or decryption;
- launch of cryptographic transformation;
- getting and saving results.

The developed program will allow you to encrypt production data using several block algorithms. To run the program, you must run GOST R 3412 K.exe encryption algorithm. Thus, a software encryption module with a convenient and understandable operation interface has been implemented, and due to the increased block length and the number of information conversion cycles, the electronic device «Kuznechik» has an increased efficiency.

CONCLUSION

Work with this software module is carried out through a convenient interface filled with all the necessary functions. This allows:

- optimize production and commercial relations between business entities;
 - implement the best logistics solutions regarding the sharing of machine and tractor fleet, financial, labor and production resources;
 - timely regulate the movement of commodity flows, develop reports and form business analytics.
- Thus, the proposed subsystem of information data protection is a major component of improving the IT infrastructure of production facilities.

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