Development of software and hardware designed to automate activities related to the storage, transmission and processing of information

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Abstract. This article describes the development of an automated information system for an online store that would meet all modern requirements. Particular attention was paid to both hardware architecture and content architecture. AIS provides the functionality that is traditional for online stores, which is necessary for an enterprise to conduct e-commerce: searching through a catalog of goods, processing and paying for orders online, the application will also help save on personnel, since its functionality does not require such a large number of employees whose duties can be delegated to the system being developed.

1 Introduction

In the era of digitalization, retail, like many other industries, has undergone significant changes. Over the past few years, the introduction of The Internet has accelerated significantly due to technological progress and cheaper production. More and more people use Internet services on a daily basis. In this regard, the number of consumers making purchases in The Internet is growing rapidly. E-commerce helps businesses (especially those with a small reach, such as small businesses) to gain access to to a wider market and establish its presence in it by providing cheaper distribution channels for its products or services. Many businesses wishing to engage in e-commerce, they are launching online stores. However, it is not uncommon for such websites to remain isolated from other software and non-digital tools, used for the implementation of the company's activities. As an example of this isolation, we can cite a database used to store information about the catalog of goods in an online store, for which there are not implemented there are no ways to synchronize with other data sources in the enterprise. This makes it insufficient to enter information about updating the catalog into only one system: in this case, the data in the other sources will remain outdated. In practice, this disadvantage is expressed, for example, when reentering information about goods into the catalog of an online store after the same information has already been entered to form a list of goods purchased by the enterprise [1].

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Another example of such isolation is a weakly integrated the online store module responsible for processing and storing orders. It is not uncommon to find systems where information about orders is stored in the corresponding table of the online store database, a letter is sent to the buyer's email address with a notification of ordering, but the store employee responsible for issuing the ordered goods does not have the opportunity to get acquainted with the list of orders directly inside the system and, if necessary, update their status. There is a need to use third-party software, for example, web interfaces for systems database management. This approach requires additional costs for staff training, and also often leads to problems with data synchronization [2].

In addition, there is no section for interaction with suppliers in common implementations of online stores. Therefore, the creation of proposals for the organization of deliveries, the formation and storage of information about the goods purchased by the enterprise, as well as the tracking of deliveries planned for the coming days have to be carried out outside the system. This way the work has the disadvantages already mentioned above: there are difficulties with data synchronization, it requires the use of additional software that implements functionality that is not present in the system. As a solution to the above problems experienced by many enterprises interested in e-commerce, a multifunctional information system is proposed for development that helps automate part of the business processes taking place at the enterprise. One of the distinctive features of the proposed system is a high degree of mutual integration of its modules: there is no need to repeatedly enter the same data into several different isolated systems [3, 4].

Thanks to this, employees and authorized partners of the enterprise have centralized access to the information necessary for work, using only one software product. It is due to the centralization of data and the creation of mechanisms for the automatic transfer of this data from one subsystem to another that it is possible to avoid unnecessary manual work, which leads to a reduction in the burden on personnel and accelerate the flow of business processes that depend on synchronized data [5, 6].

2 Objectives of the system creation

The software is proposed for development in order to launch a website for e-commerce, as well as automation processes of formation and transmission of information about deliveries, goods and orders, previously carried out through verbal communication or use third-party software. Thanks to the integration of system modules specialized for the above tasks, and the centralization of information in a system-wide database, it is possible to reduce the number of off-system operations, to abandon the previously necessary software, the functionality of which becomes part of an automated information system [7].

3 Requirements for the structure and functioning of the system

AIS "Pencil" needs to be implemented in the form of three subsystems. The architecture of the system is shown in Fig. 1.

The subsystem for communication with suppliers is designed to provide a platform that allows you to form proposals for the purchase of goods, as well as make decisions on them (accept or reject – to the supplier, approve or reject – to the owner of the enterprise). The subsystem for processing and storing deliveries and orders is designed for performing procedures for processing messages generated in other subsystems with information about planned deliveries and completed orders. It also allows you to sort by date and update the status accepted deliveries and issued orders. The e-commerce subsystem is designed to
provide network customers with access to the store's catalog, as well as to provide the possibility of making and paying for orders online [8, 9].

**Fig. 1. System architecture**

The hardware structure of the system is shown in Fig. 2.

**Fig. 2. Hardware structure of the system**
4 Conclusion

The implementation of the AIS proposed for development will allow employees and authorized partners of the enterprise to form and consider proposals on the organization of deliveries, make decisions on them, enter information about the goods purchased by the enterprise into the system, download media files necessary for advertising campaigns, track planned deliveries products and issuing orders. In addition, AIS provides traditional for online stores the functionality necessary for the enterprise to conduct e-commerce: search through the catalog of goods, registration and payment for orders online [10, 11].

Taking into account the previously mentioned capabilities of the system to ensure data synchronization between AIS subsystems, we can count on reducing the need for routine operations (primarily re-entering data), abandoning third-party software previously required at the enterprise due to the lack of functionality provided in other software products used. This, in turn, helps to reduce the material costs of the enterprise to maintain its software infrastructure, and also allows staff to allocate more time to perform non-routine tasks.

To store data in the AIS, the PostgreSQL 15 DBMS should be used. The server part of the web application must interact with the database by using the Squirrel library to build SQL queries. AIS should have a graphical user interface corresponding to the layouts shown in Fig. 3.

![Fig. 3. Interface layout for the "online store subdirectory" page](attachment:image)

References

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