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**METHODS OF ORGANIZING A LOGISTICS SERVICE USING
SCATTERED SUBSTANCES INTELLIGENT INFORMATION
SYSTEMS**

Annotation. The generalized structure of the intelligent system of transport and logistics information is given, presented using a multi-agent approach. It is proposed to direct further research to the implementation of the following goals: the creation of software agents implementing applied and system services of an intelligent system of transport and logistics information; the formation of appropriate agent platforms; the development of ontologies characterizing the features of transport and technological processes.

Keywords: transport and technological process, information resources, logistics system, integrated information system, multi-agent technology, database, knowledge base, decision-making.

It is noted that the development of the latest information technologies makes it possible to qualitatively change and improve the efficiency of modern transport and technological processes. There is a real opportunity to accumulate and use information resources in the interests of forming a unified information space of the logistics system. The article considers the features of the subject area of the functioning of transport and technological processes. It is noted that a serious obstacle is the low efficiency of organizational, technical, information and software support for the interaction of participants in these processes. As an illustrative example, the existence of many years of unresolved problems in the implementation of the interaction of domestic seaports and railways is given. It

is shown that in order to ensure the effectiveness of these processes, it is necessary to use integrated information systems that allow implementing modern requirements to reduce operating costs and improve the quality of transport services. To form an integrated information system, it is proposed to use an approach using multi-agent technologies that will radically modernize the organization of processes in logistics systems. The possibilities of the proposed approach are outlined, the interpretation of the elements of logistics business processes as intelligent agents is given. The informative information resources forming agent platforms of applied and system services of the intelligent system of transport and logistics information, as well as components of databases and knowledge about transport and technological processes are presented.

The effective functioning of modern transport and technological processes (TTP) is impossible to imagine without the constant use of the latest information technologies. The ability to quickly respond to the needs of the market and the active exchange of information between the links of the transport network are an integral characteristic of the supply of goods of any kind. Software complexes and information systems created for planning and supporting the adoption of various commercial decisions are a key factor for ensuring high quality of service and continuous improvement of transport operations. With the development of Internet technologies, it becomes obvious that the promising areas of development of the logistics services market are focused on the active use of electronic forms of TTP support. Historically, the accumulation and use of information resources (IR) was carried out separately in each mode of transport in order to ensure its effective management and functioning. The situation was similar in other areas of logistics. Traditionally, the use of various information technologies in logistics systems occurred separately, only in the interests of a particular participant in the TPP, and over time it became obvious that such an approach is ineffective and the integration of IR is extremely important to obtain a single information space (UIP) of the transport and

logistics network, since the UIP will provide the necessary speeds and volumes of information exchange, as well as provide the most the exact data required by the user will allow a detailed analysis of the technical co-economic parameters of various options, simulate various processes in order to make optimal decisions. However, the integration of IR in transport logistics is an extremely difficult problem. With the development of integration processes, more urgent problems of optimization and organization of information flows arise, which, of course, is associated with the peculiarities of the subject area of the TPP:

- high dynamism of the subject area;
- the difficulty of obtaining complete, accurate and reliable information;
- stressful nature of situations;
- lack of decision-making time;
- failures of technical means;
- high probability of erroneous actions of people;
- force majeure circumstances.

A significant obstacle is also the low efficiency of organizational, technical, informational and software support for the interaction of TPP participants. A typical example is the existence of many years of unresolved problems in the implementation of the interaction of domestic seaports and railways. The achieved level of corporate governance of JSC "Uzbekistan Railways" allows the use of new transport service technologies, including monitoring the movement and processing of goods along the selected route and optimizing procedures for intermediate processing and storage of goods. However, the "bottleneck" in the delivery of international goods is the supply and unloading of wagons at the seaport, as well as the idle time of wagons at pre-port railway stations. The use of a liability mechanism in case of non-fulfillment of concluded agreements in the form of imposing fines for late delivery and unloading of wagons at seaports, as well as for downtime of wagons and for "abandoned" trains did not provide the desired result. Since

various telecommunication, switching, network and information technologies are used in logistics systems, the control and management processes of the TTP are dramatically complicated. In these conditions, the intellectualization of TTP management is becoming increasingly important, the strategy of which is to develop and implement effective information technologies that ensure the closure of cycles in real time. Organizational and technological management, significantly increasing the validity and consistency of decisions taken by officials on the management of the TPP. The analysis of this complex and important problem shows that such technologies are technologies of multi-agent systems. The multi-agent approach, which is the basis for the formation of the AIS, will radically modernize the organization of the TPP. The expected result of this approach is high efficiency, flexibility and reliability of functional subsystems and their management system as a whole, the ability to provide a high level of quality of logistics services, and as a result, high competitiveness in domestic and global markets.

In the modern view, an agent is a software system that has the following features: autonomy, interaction, mobility, reactivity, activity, individuality of the vision of the "world", sociability and cooperativeness, intellectual behavior. Since the tasks of the TTP operation require a distributed and parallel solution, it is necessary to develop and apply methods of cooperation, coordination and communication of agents in the process of their solution, thereby ensuring the joint solution of a single task distributed across many nodes of the logistics network using fairly simple software units implementing complex interaction mechanisms, which is determined by bilateral and multilateral dynamic relations between agents. We define an application service as a logical representation of physical, informational and human resources that implements a business function and has the following properties:

- defined by one or more explicit technology-independent interfaces;

- weakly connected to other similar resources and can be called by means of communication protocols that allow resources to interact with each other.

It is obvious that the application service defined in this way is nothing more than an "intelligent agent". The business function that this application service implements must be unambiguously described in accordance with certain rules accepted for all services (the set and types of input and output data must also be described). Moreover, for information systems external to the application service, it should not matter in which programming language it is implemented, on which hardware and software platform it functions, locally or remotely located.

Further research should be directed to the creation of software agents implementing applied and system services of an intelligent transport and logistics information system, the formation of appropriate agent platforms, the development of ontologies characterizing the features of the TTP, as well as the construction of effective procedures for coordination and communication of software agents.

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