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## Basic Concept for Modernization Automated System of Federal Information Fund of Domestic and Foreign Catalog of Industrial Production.

Alexey N. Schennikov<sup>1\*</sup>, Tatyana G. Tsunikova<sup>1</sup>, Dmitry Y. Stepanov<sup>1</sup> and Dmitry E. Kolosov<sup>1</sup>

<sup>1</sup>Federal State Budget educational Institution of Higher Education "Moscow Technological University" (Moscow, Russia)

### ABSTRACT

With the rapid development of information technologies the successful functioning of the organization depends on the correct distribution of the main and auxiliary functions of the company and the allocation from them the functions that can bring more benefit. So, questions regarding improvements of technical, application, data and business elements of automated industrial catalog system considered in the paper. The analysis of the current automated system architecture were made and it showed that bid data handling and system friendability are the prerequisites for improvement in automated system concept. Thus, modernization involves maintaining separate servers per key function, using specialized applications for analytical reports and integration with external information systems, multilevel document classification and high level business processes description. So, the automated system development might be useful for the uniform improving of the domestic and foreign catalogs with industrial products.

**Keywords:** Automated system, enterprise architecture, modernization, industrial production catalog, innovation projects, Moscow technological university.

*\*Corresponding author*

## INTRODUCTION

The development of modern information technologies (hereinafter – IT) dictates the conditions of functioning of the organization. Increasingly considered an approach based on the allocation of the main and auxiliary functions of the company. The main activity that brings tangible benefits to the enterprise is seen as a priority component in relation to the supporting part. What should be the advisability of reducing the cost of maintenance support activities. In this case we are talking about outsourcing, as part of the business processes of the company is transferred to the mercy of other organizations [1].

What will it give? First of all, company can pay more attention to most critical business processes and their optimization. Even if enterprise does not implement outsourcing, for example due to risks, accent on critical and important processes is reasonable. Same in scientific life, objective defines tasks and only then solutions.

From this point of view, reusing own experience to solve problems is an important task. To be precise we are discussing the knowledge base. Automated system of Federal information fund of domestic and foreign catalog of industrial production (hereinafter – AS) can be considered as a such type of knowledge base. AS was developed in 1956 to resolve a wide range of questions regarding innovation projects [2]. However, IT do not stand still, and AS need improving.

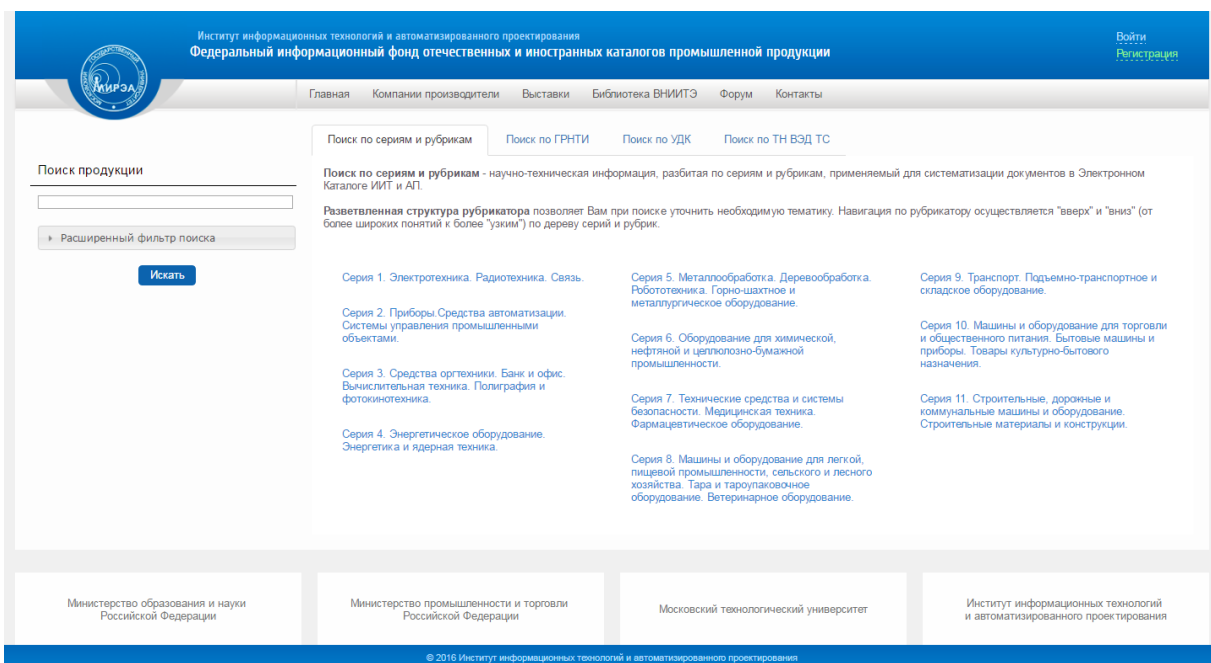
## OBJECTIVE

The purpose of this paper is to review the main points of the conceptual architecture of the AS modernization to provide more effective information support of innovative national projects of the Russian Federation. The following questions are addressed sequentially to achieve this goal:

- a retrospective analysis of the literature summarizing the main achievements of the AS, and design issues;
- analysis of the main characteristics of the specific implementation of the functionality of the AS;
- projective solutions to modernize the architecture of the AS.

## RESEARCH METHODOLOGY

### Literary source analysis



The screenshot shows the initial system interface for the Federal Information Fund of Domestic and Foreign Catalogs of Industrial Production. The header includes the logo of the Institute of Information Technologies and Automated Design (ИИТЭ) and the text "Институт информационных технологий и автоматизированного проектирования" and "Федеральный информационный фонд отечественных и иностранных каталогов промышленной продукции". The main content area features a search bar with the text "Поиск продукции" and a search button labeled "Искать". Below the search bar, there are several search filters: "Поиск по сериям и рубрикам", "Поиск по ГРНТИ", "Поиск по УДК", and "Поиск по ТН ВЭД ТС". The main content area displays a list of series and rubrics, including: "Серия 1. Электротехника. Радиотехника. Связь.", "Серия 2. Приборы Средства автоматизации. Системы управления промышленными объектами.", "Серия 3. Средства ортехники. Банк и офис. Вычислительная техника. Полиграфия и фотокниготехника.", "Серия 4. Энергетическое оборудование. Энергетика и ядерная техника.", "Серия 5. Металлообработка. Деревообработка. Робототехника. Горно-шахтное и металлургическое оборудование.", "Серия 6. Оборудование для химической, нефтяной и целлюлозно-бумажной промышленности.", "Серия 7. Технические средства и системы безопасности. Медицинская техника. Фармацевтическое оборудование.", "Серия 8. Машины и оборудование для легкой, пищевой промышленности, сельского и лесного хозяйства. Тара и тароупаковочное оборудование. Ветеринарное оборудование.", "Серия 9. Транспорт. Подъемно-транспортное и складское оборудование.", "Серия 10. Машины и оборудование для торговли и общественного питания. Бытовые машины и приборы. Товары культурно-бытового назначения.", "Серия 11. Строительные, дорожные и коммунальные машины и оборудование. Строительные материалы и конструкции." The footer includes the text "© 2016 Институт информационных технологий и автоматизированного проектирования" and the logos of the Ministry of Education and Science of the Russian Federation, the Ministry of Industry and Trade of the Russian Federation, Moscow Technological University, and the Institute of Information Technologies and Automated Design.

Figure 1: Initial system interface

Official website is the main source of information about the current AS architecture [3]. According to the name of AS, the primary purpose of the system is storing the electronic catalog of production and catalog scanned copies. Thin client is used to access to the system through internet. Catalogs of domestic and foreign production are classified by three levels of description. Searching by short text, series and head, state classifier scientific and technical information (hereinafter – SCSTI), universal decimal classification (hereinafter – UDC), commodity nomenclature of foreign economic activity of the customs union (hereinafter – CN FEA CU) are available by using web application (fig.1).

Having tested AS and analyzed advantages and disadvantages of the system, the following can be emphasized:

- limitation of catalog bases is stated;
- no integration with external catalogs is available;
- product classifier is restricted by three levels of description;
- there aren't any instructions to be deal with a system.

Mentioned above disadvantages can be resolved by modernization of AS architecture. Architecture can be considered as a set of applications, technical or business processes and data of the company (fig.2).

Let's follow classic interpretation of architecture to improve AS. In that case modernization concept will require sequential improvement of each architecture element done below.

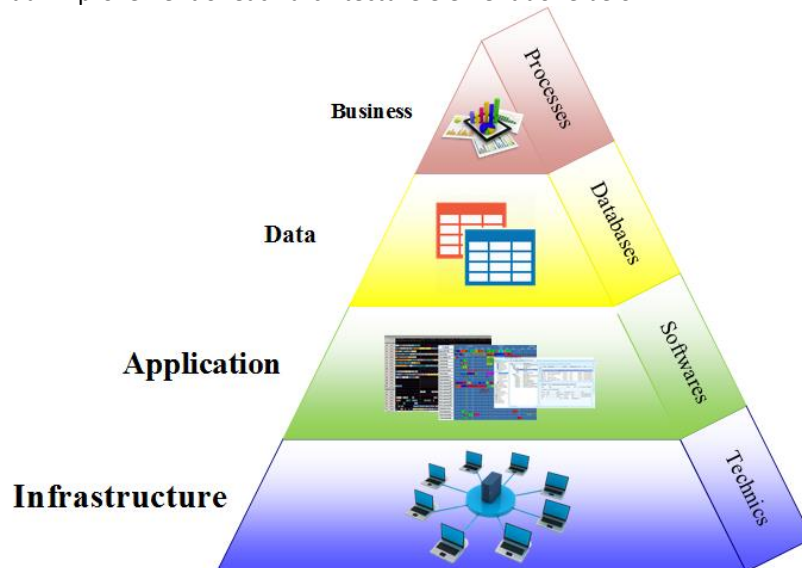
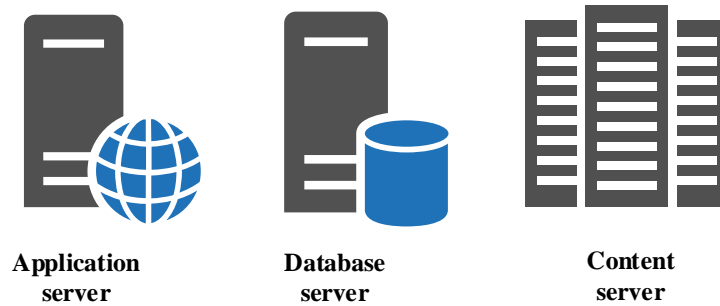


Figure 2: Components of enterprise architecture

### Technical infrastructure improvement

Technical architecture is defined by initial requirements. Now we are talking about transactional data processing per day: creating products in particular catalog, product search queries, uploading product catalogs, etc. When 1-3 product records created and 5-7 SQL queries run per day, it is one case. On the other hand, if we are dealing with a Federal information system, processing 10.000-100.000 records per day, it is completely another story, imposed specific requirements to technical architecture of automated system [5].

Designing information system (hereinafter – IS) and technologies claims enterprise engineering in «As-Is» and «To-Be» models [6]. Let's consider the only «To-Be» notation is used. Initially AS is oriented to bid data processing, therefore following technical architecture improvement are suggested (fig.3).



**Figure 3: «To-Be» technical architecture**

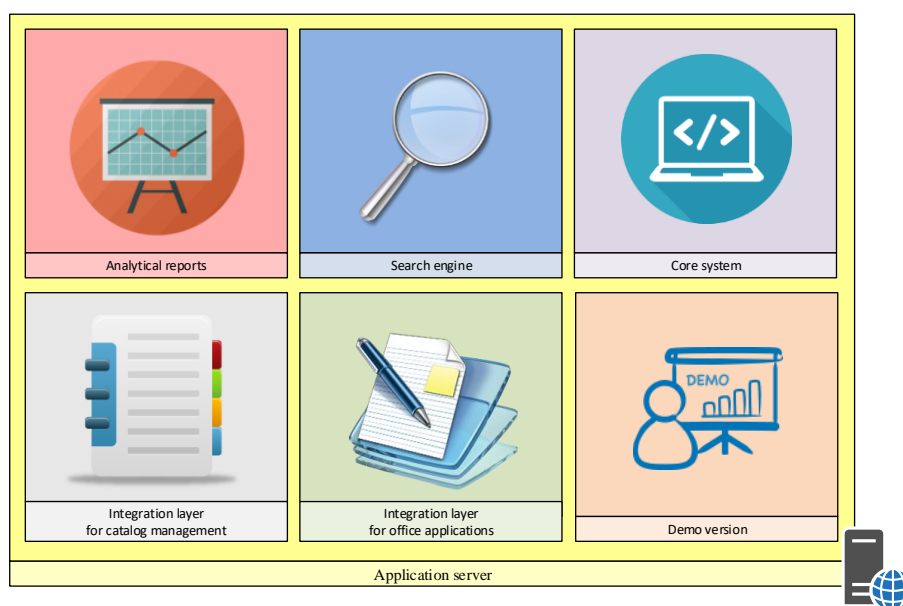
According to the picture above technical modernization implies separation servers per key system function: application server for web applications, database server for storing product catalogs and other structured information as well as content servers to store product catalogs scan copies. All that provides stability for most critical applications of AS when increasing number of master and transactional data.

**Upgrading AS application architecture**

Technical level – the place of implementation and storage applications. Applications can be subdivided into two types: technical and user. The first allows to administer «iron» system, while the latter provides access to the system users. We focus our attention on a second type of software.

So what do users need? To answer the question should be differentiated user speakers on suppliers of industrial products and services, customers and administrators. The first group of people are interested in the presence of the flexible mechanisms of product catalogs processing, both in individual and batch mode; the second group – in a convenient interface and advanced data mining tools; finally, the third group – in automatic loading of directories and presence consolidated analytical reports [7].

The above proposals form a series of system requirements for the applications. Summarizing the interim results, it can be argued that the modernization process design and operation of the AS include: installation of programs for the integration of external IS to exchange electronic catalogs; adapting the interface to office applications; the use of advanced information search mechanisms, and the availability of tools produce all kinds of reports (fig.4).



**Figure 4: «To-Be» application architecture**

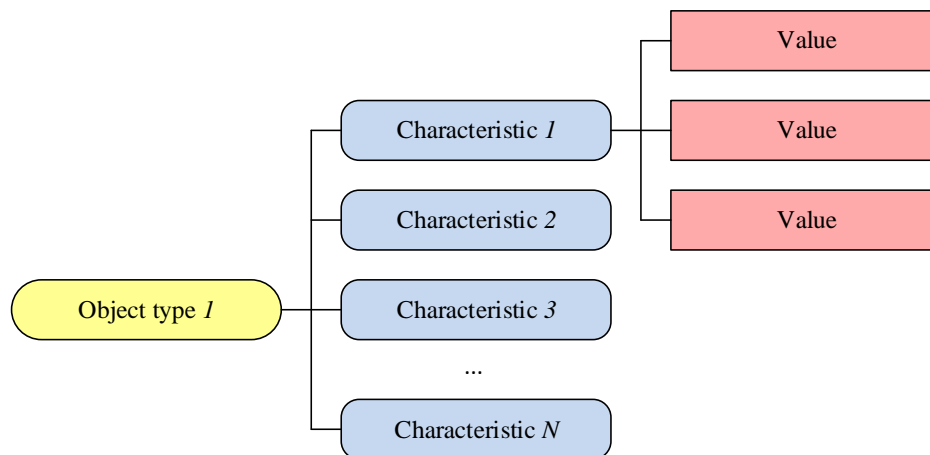
**Modernization of AS data architecture**

Web-based applications through a DBMS (database management system) process the information in a database (hereinafter – DB). These systems are determined by the organization, the range of products and store formats scanned copies of description. The classification of each product is carried out at several levels (fig.5). At the same time a data storage architecture means the Model type relationships between DB tables.

	Series and heads	SCSTI	UDC	CN FEA CU
Level 1	Head name	Head	Code 000-999	Chapter 1-10 Group 00-99
Level 2	Name	Code 00.00-99.99	Code 000.00-999.99	Code 0000-9999
Level 3	–	Code 00.00.00-99.99.99	Code 000.000-999.999	Code 0000000000 - 9999999999

**Figure 5: Product classification by levels**

In case of AS usage entity relationships between «organization – product» and «product – scan copy» set as «1:M» for both pairs. [8] Specified entity relationships are rational and do not need any changes. In that case product description can be improved by implementing more classification levels. To do so custom tables «object type – characteristic» and «characteristic – value» and corresponding web interfaces are to be redeveloped (fig.6). This will provide more flexibility to data organization and management. However, classifier reinforcement will require program changes in standard analytical reports.



**Figure 6: Product classification improvement**

**Upgrading business architecture AS**

The data as such are input and / or output signals for any conventional business process. Description of business processes can be carried out with all sorts of methods at different levels of detail [9]. In general, business architecture means the totality of the organizational structure and top-level description of the processes. Ensuring openness speakers require isolation and illustrate key processes user interaction with the system. For convenience, the card business processes can be represented in the upper level without unnecessary detail, but the mechanism of the transition on the level of operations must also be present.

Proposed business processes map includes high level description of user registration, product search and catalog uploading procedures based on ARIS VACD (value added chain diagram) [10]. Moreover, outcomes of each process are also displayed. Processes map can be placed at initial webpage to briefly inform users about system features (fig.7). In this case organizational structure can include registered or anonymous users, administrators etc.

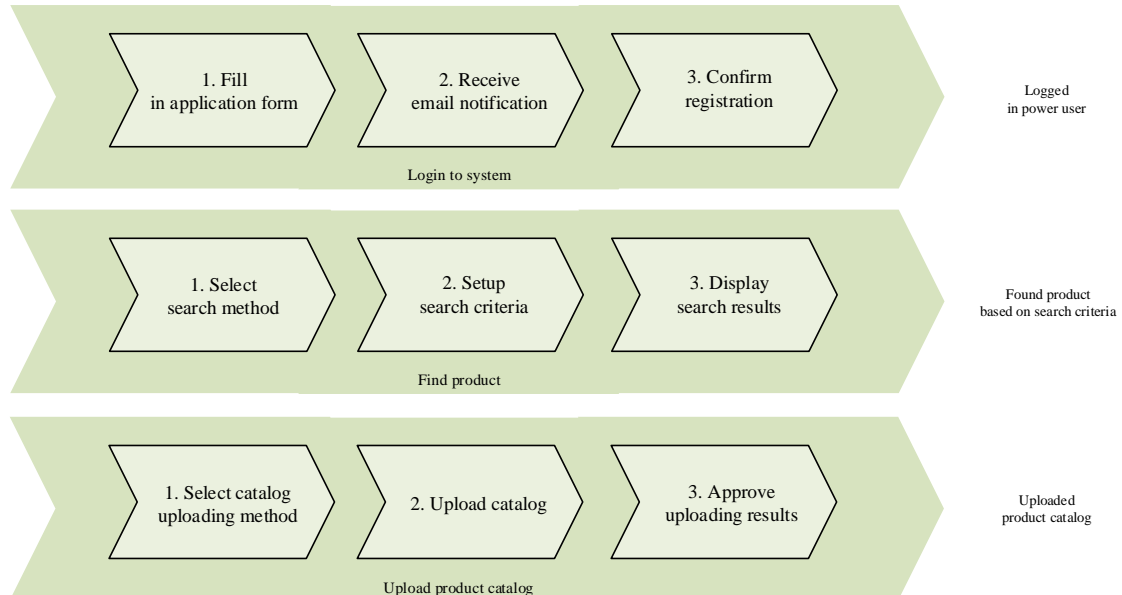


Figure 7: «To-Be» business architecture

### CONCLUSION AND RECOMMENDATIONS

To propose concept of AS architecture modernization technical application, data and business components are to be considered separately. As a result, system improvement includes maintaining distinct servers per key function using specialized software applications for analytical reports and integration AS with external IS; multilevel document classification and high level business processes description.

Bid data handling and system friendability were prerequisites by AS improvement concept. The proposed architecture of AS means automated data management for creating, editing and deleting product catalogs. Marketing campaigns and legislative changes is to allow populating the product catalogs of AS in batch. Thus, complex approach makes it possible to improve uniform domestic and foreign catalog of industrial products to save time for searching high quality supplier.

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