

THE SEMANTIC INFORMATION MODEL FOR CLUSTER "BIOLOGICAL ACTIVE SUBSTANCES IN FEEDING AND COSMETICS"

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Abstract

The article presents a unified data model for cluster "Biologically active substances in feeding and cosmetics". The basic information components and their relationship are indicated. The information system provides the data in a structured format thereby realize the concept of interoperability and allows the integration of different systems, storages, processing and re-using of information. The best practices for combining and adapting information resources to support semantic interoperability are developed.

Keywords: *semantic models, bioactive substances, feeding, cosmetics*

1. INTRODUCTION

The cluster "Biologically active substances in feeding and cosmetics" develops scalable and sustainable system for managing processes in the food and cosmetics, optimizing patient care, public health and clinical research in health systems and institutions. It develops the best practices in combining and adapting IT resources to support semantic interoperability.

One information model to justify strategic investments, including opportunity costs the key stakeholders must be determined. To achieve a global impact in the cluster are included leading manufacturers of food and cosmetic products in Bulgaria. Each of them has a dominant market position in the relevant product category:

- "Rubella Plc owns 30% of the national sales of dentifrices and 13% of those hair dyes;
- "Lavena" - 38% of the production of children's cosmetics under the brand "Bochko"
- "Bulgarian Rose" is a major manufacturer in Bulgaria of products with natural rose oil - up to 50% of all products;
- "Rosa Impex" owns about 25% of the production of hair dyes and white cosmetics,
- "Ikarov" Ltd is a major manufacturer of Bulgaria of natural oils.

At present, the company's portfolio includes over 450 products. The markets where cluster members realize their production include more than 30 countries from all continents, like France, Germany, UK, Finland, the Netherlands, Spain, Poland, Hungary, Russia, Ukraine, Moldova, Romania, Kazakhstan, China, Japan, Turkey, Lebanon, Iran, Iraq, Saudi Arabia, Syria, and others. Some brands of participating companies produce a solely abroad. Companies' efforts are aimed at creating and promoting sustainable market for original products with unique active ingredients, modern look and stable high quality. The fully satisfaction the needs of customers and exceeding their expectations are particularly important prerequisite and a priority of the participants in the cluster. The participation in the cluster boost producers innovation departments in the development of modern cosmetic formulas, with the inclusion of traditional and newly synthesized bioactive components. This will contribute to:

- improving the quality of manufactured products;
- improve and increase the spectrum of action of cosmetic products;
- increase market as cosmetic products with proven bioactive substances will affect and improve the appearance and health of consumers.

- improvement of a number of indicators of public health by preventing diseases such as allergies (development of cosmetic products with no / low allergenic ingredients) and cancer (skin cancer), due to the protective effect exerted by certain categories of cosmetic products (eg sun safety funds).

The cluster provides a broad presentation and promotion of these products on the market, including especially and primarily external, using all possible channels for marketing, advertising and distribution, particularly substantially electronic markets.

The traditional idea of information systems tailored to the specific costs for database applications is changing rapidly. The change is particularly fueled of the development of the software industry, which uses new common components and standards for software solutions and of the "onslaught" of the information revolution. In turn, this change has led to a new set of information services which are homogeneous models in presentation and interaction, open source and architecture, and with a global reach. The requirements arise primarily of the option for application in areas such as e-commerce and banking, manufacturing (including the software industry), training, education, and environmental management and others.

The future systems will need to ensure smooth interaction between a wide variety of independent sources and manufacturers of data and next-generation information systems and applications running on different platforms and distributed information networks. Metadata will play a crucial role in describing the content of these sources of data and the data itself to facilitate their integration.

Large variety of models of interaction, oriented towards consumers must be supported by the next generation information systems. These interactions may include navigation, queries and receiving of information combined with personal notification and authentication. Such interactions will also need to be adequately integrated into the software, and should be included in the dynamic and highly personalized information related environments.

All these are challenges for the next generation information systems.

2. AN INFORMATION MODEL OF CLUSTER "BIOLOGICALLY ACTIVE COMPONENTS IN NUTRITION AND COSMETICS"

Composition of the data in a structured format allows / enables / data to be transferred, both between individual compilers of data / separate databases / and between the individual members of the cluster and platform for on-line search using specialized WEB applications.

Fig. 1 shows the single information model of a cluster "Biologically active substances in feeding and cosmetics" / BASFC /. The basic information components and their relationship are indicated.

The communication between the local database, stakeholders and external information systems is provided in two ways, realized on servers where the information system of the cluster is uploaded:

- WEB site of the cluster;
- WEB services and applications system.

This allows the specialized databases to communicate directly with the platform for visualization of cluster information, and also allows specialized databases to communicate directly with the proposed structured model for data exchange.

The implementation of the transport protocol for the information components of the cluster allows the transfer of data between arrays online / databases and repositories / and their external users (directly or indirectly). On the other hand, it provides:

- Maintenance of data for stakeholders, products, staff and bioactive substances of the cluster's members;

- End-user / user of the system / can build its own interface and applications that use transport protocol data;
- End-user / user of the system / can build its own data model based on the proposed transport protocol data to integrate into the information system of the cluster;

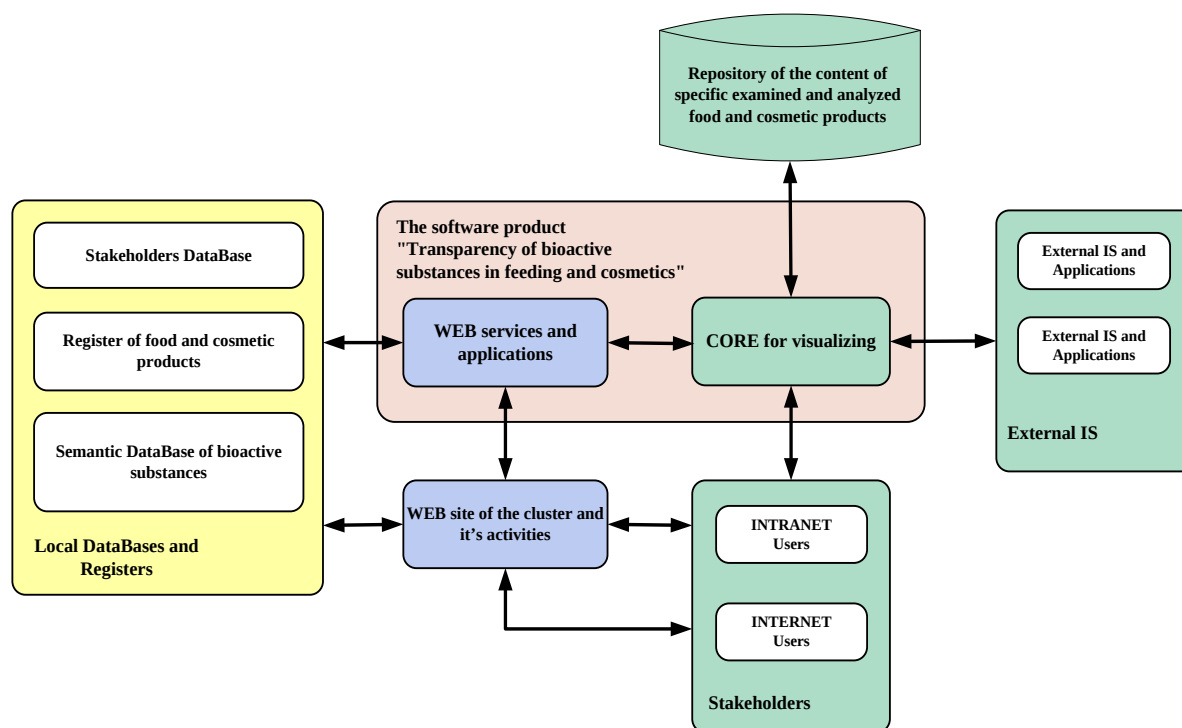


Fig.1 The single information model of a cluster "Biologically active substances in feeding and cosmetics"

3. INFORMATION OBJECTS DESCRIBED IN UNIFIED SEMANTIC MODEL

Information object of the cluster "Biologically Active Substances in Feeding and Cosmetics" represents a single or multiple data collected, created, stored or processed by cluster body.

The information objects are:

- "term" - a concept which is interpreted unambiguously by all participants and users of the information system;
- "nomenclature" - final list of related terms included in the information system;
- "value" - presents magnitude and described by a finite number of meanings assigned to formal restrictions;
- "segment" - a structure composed of already established and set terms, nomenclatures, values and / or other segments;
- "document" - a segment for which a software application allowing complete and accurate visualization of the information contained here in.

For each of above mentioned information objects a set of circumstances / attributes / are defined and described. They are including:

- name - defines the full name of the data object of this kind "term" with which the object is unambiguously individualized;
- use - defines a brief text explanation of the information object of this kind;
- membership - defines the indication concerning the affiliation of the object. Ability to determine the object is associated with a member of the cluster body; possible values are "internal" or "external";
- instructions for processing - defined in free text or computer-executable descriptions unify the creation of procedures editing, visualization and other processing related information object.
- XML definition - defines the contents through the unique identifiers of the objects entering its composition and already described in the information system through technical standard - definition in XML format with name, unique system of information objects;
- instructions for validity check - to define rules for checking the validity of the content of the object in a formalized manner;
- nomenclature errors - defined set of errors identified in accordance with their terms as defining the "Terms".

For describing of the XML structure of information objects the XML SchemaDefinitionLanguage (XSD) standard based on Recommendation XML Schema Working Group "XML SchemaWorking Group" consortium World Wide WebConsortium (W3C) is used.

4. DATA TRANSFER MECHANISM

The cluster information system provides information from specialized data bases online in a structured XML format based on adopted transport protocol;

- On-line WEB services and applications provide communication between the WEB servers and specialized data packets;
- End user submits a request for information;
- On-line WEB services and applications find the requested information and transmit it to the end user;

The mechanism of transfer of the data is presented in Figure 2

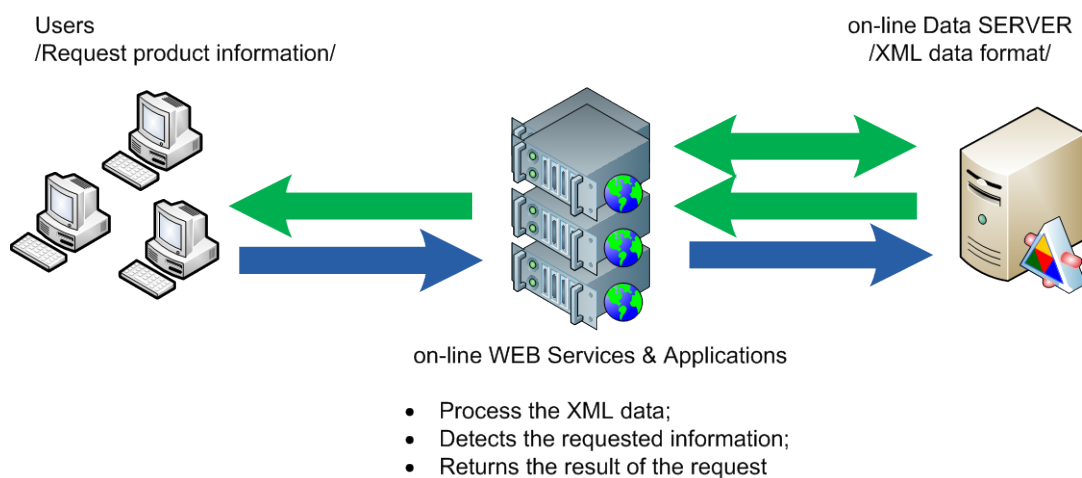


Fig.2. The mechanism of data transfer

5. CONCLUSIONS

The data from different systems have different format, as at the same time must ensure access to information from different institutions at different times. This can be done by setting standards for interoperability, which enables the integration of information, allows transparency of the activities and results for all stakeholders.

The implementation of the activities described in the context of the development of information technologies has wide sharing and discovery of relevant information. The successful implementation of this is related to the provision of information interoperability and standardization of the information format. Semantic approach allows structuring and presentation of information in an appropriate form.

The realization of operationally compatibility which would allow integration and inclusion of the realized projects to the overall strategy, but also their further development and improvement caused by the change and the level of development of the national strategy for e-government. Using semantic approach allows to integrate completely different systems and at the same time can be stored and processed and repeatedly used information from different sources.

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