Design of Internet Portal

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Abstract— Society has a long, rapidly growing volumes of data, management of which is further complicated by their heterogeneous and poorly structural nature. In terms of socio-economic-globalization, ensure the effectiveness of information systems (IS) requires new approaches to their design and implementation. Accelerated, the widespread introduction of IT in life and human activity requires integration of heterogeneous data objects and etadata, IP, often built on mutually contradictory methodologies and models (not including those of leading manufacturers of system software, like Microsoft, IBM, Oracle, SAP, BEA and others). Problem search technology, language and software tools to develop unifying large-scale software so far is the focus of a number of leading research groups. Thus, the need to create models and their supporting integration tools and IP support throughout their life cycle. In this connection there is a family of interrelated problems associated with multiple standards and the heterogeneity of design methodologies, incompatible mathematical foundation for modeling and object description language (Meta) data, as well as unbalanced interfaces between the database, IP and users. The aim is to construct a methodological foundations of the semantic design of large-scale IP and its application for collecting, processing and generation of accounting information in the Internet environment.

The problem under consideration is part of a comprehensive conceptual approach to a continuous, integrated design, implementation and maintenance globally distributed Internet Portal, which includes a methodological scheme, the mathematical model (meta) data for the domain and computing environment, as well as semantic tools for design and implementation, architecture and interface solutions for prototype and full-scale enterprise web portals.

I. INTRODUCTION
The methods used were synthesized the main provisions of the theories of finite sequences [1], categories [4], computing and semantic networks [5]. The methodology allows for the first time to organize a continuous, integrated IC design for wide area networks throughout their life cycle. Known approaches have methodological or "breaks" or does not lead to satisfactory solutions to the industrial criteria of scalability, scalability, reliability, etc. Created approach includes:
1) set of models (conceptual domain model [11] model abstract machine for computing environments and tools [7]);
2) a methodology for designing, implementing and maintaining IP [8];
3) The family of criteria for selecting tools, prototyping, esign and implementation of applications [11];
4) the tools to visually design Semantic (ConceptModeller), IP content nagement [7,8]. Conceptual design integrates IP model (meta) data presented objects, as well as language and tools manipulation. The methodology supports a "through" bi-directional iterative design and implementation of IP and provides control of completeness, consistency and integrity of objects (meta) data on all of their life cycle. As part of the methodology under the initial concept refers to intensional physical or abstract object is selected in the subject field. Constant (or specificity) are to separate individuals interpreted primary concepts. Under the interpretation |Di| initial concept includes all the constants of domain Di, associated with the corresponding domain of specifications each |Di|. Any variable that is both free and bound, must be explicitly assigned a type. For free variables is graphically illustrated by the arc type, ie the arc labeled "t", pointing to the primary concept that the type of constants assigned to a variable. Under the frame means the graph representing a unit of knowledge in terms of access and processing. Under a simple frame will mean a frame without subgraphs that contains only constants, variables, and arcs. Database-level frames relevant respects. Frames are the type of arcs and interpretation can be structurally divided into event-based, function (predicate) and characteristic.
Frames the events of the model, in which events are understood as predicates are a special kind. Elementary frame events in a network representation looks like a site that indicates the predicate event, role-playing with the outgoing arcs marked symbols indicating the roles and nodes with the notation predicate arguments - typed variables or constants of the primary concepts. Frames are patterns of events (ie, intensional objects), because their signifying no arguments, and therefore carry no information about the actual event. However, after the valuation of all variables by constants of appropriate types, predicate (and frame events) is a Boolean value. Role of the arc represent arguments correspond to the events and arguments within the developments in this is the most important distinction between the role-arcs and logical arguments predicates. Legend roles of event frames are presented in Table. I

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Table 1

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Designation</th>
<th>Interpretation of semantics</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Agent</td>
<td>Action initiator</td>
</tr>
<tr>
<td>o</td>
<td>Object</td>
<td>Recipient’s Action</td>
</tr>
<tr>
<td>s</td>
<td>Source</td>
<td>Location recipient action before the event</td>
</tr>
<tr>
<td>d</td>
<td>Destination</td>
<td>Location of recipient after the event</td>
</tr>
<tr>
<td>r</td>
<td>Result</td>
<td>Action result</td>
</tr>
</tbody>
</table>

**A semantic tool to support the methodology**

Design methodology transforms the specification of the concepts of IP domain is essentially the model further, using the CASE-tools in the scheme family of frames, and object-relational database (meta) data, and finally, in a formal Architecture and the interface description of the target IP. The methodology provides a semantic iterative algorithm for the integration of IP components with the ability to reverse engineer. In this case, “through” the continuous nature of the methodology is provided by semantic CASE-tool for the automated translation ConceptModeller Object Model (Meta) data into UML-specification, with subsequent conversion to target database schema (meta) data and IP. Main features of CASE-tools:

- Problem orientation (the user operates the natural-language object-relational concepts);
- Visualization;
- Support for modern design standards (UML,BPR);
- Integration with proven industrial CASE-and RAD-tools (IBM Rational, Microsoft Visual Studio, etc.);
- bi-directional design (supported by re-engineering).

Thanks to these advantages, a tool applicable for a wide range of subject areas and allows you to build a model in terms close to natural language (see examples below). In addition, it becomes possible Automatic translation database schema (Meta) data and IP in their conceptual model throughout the life cycle (design, CASE-and RAD- development, testing, maintenance, and revision). The result is the ability to test and verify IP or purely mathematical software (for example, using the language SML) for any arbitrary level of abstraction.

**Features tool for designing and implementing**

The user interface for the design of frames is shown in Figure 1.

![Fig. 1. User interface](image1)

Interface intuitive visualization of frames similar to the majority of software processing vector graphics. Thus, the simple frame rendered includes tools for different types of concepts and arcs (for example "t"-arcs for variable types). Double - graphic and structural - of metadata requires frames development of storage structures, which has the properties of completeness, scalability and unique interpretation (including the case of multiple maps). As a development platform chosen among Microsoft. NET, as well as DB format - XML, which allows easy visualization and Elements of frames have the following attributes: id, type, name, coordinates, hierarchical pointers to predecessor and successor, as well as a number of optional parameters. Managing XML-based database on the component XML Designer, the built-in Microsoft Visual Studio 2005, which is used to generate templates based on database schema XML. XML metadata file contains a complete description of the database, an example of representation element of the frame shown in Figure 2.

```xml
<?xml version="1.0" standalone="yes" ?>
  <NewDataSet>
    <Elements>
      <Id>1</Id>
      <Type>Var</Type>
      <Name>MyVar</Name>
      <Left>100</Left>
      <Top>100</Top>
      <Width>100</Width>
      <Height>50</Height>
      <Prev>0</Prev>
      <Next>0</Next>
      <Description>No Description</Description>
    </Elements>
  </NewDataSet>
```

![Fig. 2. XML-frame description of the fragment in a database visualization](image2)

The above fragment of XML-code describes the type of MyVar with Var visual size of 100 by 50 points. An example of a simple visualization tool frame is shown in Figure 3 visualizes the event and supply ("supply") of the candidate (CANDIDATE) for a vacancy personnel manager (MANAGER) employer.
The tool of over 4500 lines of source code in C# implemented in the Microsoft Visual Studio 2005 and includes an event-oriented visualization components of frames, their translation to UML and visualization of results. Visualization component provides methods for determining the behavior and graphical representation of elements of the frame. All elements of the graphical user interface created in Editor Adobe Photoshop and imported as resources.

**Application of Technology**

The technology has been tested practically in the International Group of Companies "Itera". The application architecture supports an integrated data storage and metadata. The methodology converts the frame-based domain model in UML-diagrams of the family, followed by CASE-tools in complex ER-diagrams, and Finally, the database schemas (meta) data of target IP. Based on technology developed architecture, interfaces, rapid prototyping and full application for managing corporate information Resource-based Internet portals. The practical significance of the results is determined by the advantages developing large-scale IP proposed methods. Terms vnedroeniya significantly reduced compared to existing commercial software. Reduction implementation costs achieved through improved storage availability and support integrity. Significantly simplified optimization productivity improvements and IP. On the basis of the proposed technology offers several enterprise applications International group of companies "Itera" with headcount of about 10 thousand Employees: IP human resources management UniQue, IP Content Management Internet-(www.itera.ru) and Intranet portals. Maintenance of IP, according to experts, reduces time and implementation costs on average about 1.4 times, as well as significantly increases the efficiency of management (meta) data.

**Results, Recommendations and perspectives**

As a result of implementation based on the methodology, compared with commercial software significantly reduced the time and cost of implementation, as well as significantly expanded functionality. Practice has confirmed the implementation of adequacy of the developed approach in general, and of its constituent methodologies models, tools and application solutions.

**REFERENCES**