TOWARDS E-GOVERNMENT SERVICES IN RUSSIA

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Abstract: Transition to e-government services is a worldwide tendency. However, each country possesses its own specifics, which need to be taken into account. The given study is dedicated to transition towards e-government services in Russia. A method for formal specification of Russian government services is presented. This method can be used for e-government services optimizing, restructuring and checking, design of e-access software, and semi-automatic producing services' Web-content. We have adapted OntoGov approach to specify domain ontology. Basing on the mentioned ontology separate services have to be described: process model (customized BPMN notation), document model (based on Feature Diagrams) and description model. An example of a Web-content generation under formal specifications is presented. Pilot method deployment for specification of Russian government services, which required Russian and Finnish citizen to communicate with each other, is described.

1 INTRODUCTION

Conversion of government services into e-services allows increasing significantly efficiency of services for citizens: the need to visits numerous institutions is eliminated, the desired service is available from home, online. Actively being developed both general e-government services concepts (Shareef, 2011), (Ajeeli, 2010), (Mitrakas, 2007) and multiple research on adaption of such concepts in countries of Europe (Hogrebe, 2009), Chile (Smith, 2001), Tanzania (Kaaya, 2009), etc.

One of the main problems at transition to e-government services in Russia lies in complexity laws and regulations describing these services. The given domain is objectively complicated: in Russia there are many government services, they contain a lot of "branches", and for services obtainment a large number of documents is required (the list varies depending on applicant's personal situation). Government authorities specifying legal documents for government services are synchronized insufficiently. These documents contain a lot of contradictions, identical concepts are named differently. It frequently occurs that there are different ways for service obtainment as government institutions' functions are often replicated. Ultimately, apart from common citizens, the officers themselves are not able to indicate precisely, which steps are to be taken in various situations on order to obtain a specific service. Moreover, at realization of a single service a number of institutions may be involved, consequently, each organization has its own subprocedures. At last, presently the Russian community lacks a unified classification of government services: in various regions the same

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procedure is listed under different names, and diverse services contain same functionality.

Therefore, conversion to e-government services in Russia demands a significant optimization and ranging of the existing public services. One way to reach the goal is creation of existing services formal description, however, stricter than legal documents. Such descriptions would have been a support at inspections and optimizations of government services, eliminations of contradictions and replications in their specifications, and also be a simplification of their maintenance and update. The above is especially urgent in connection with annual creation of hundreds of new services, and the existing ones are being altered actively. Besides, formal descriptions may be used at semi-automatic Web-content development. This Web-content should describe government services for citizens. In Russia there is a problem of citizens' lacking information both on the spectrum of services available, and detail of their realization. This leads to wasting a lot of time at services obtainment. Amount of Web-resources outlaying government services information in the Russia is still limited.

In the given paper we are focusing on creation of tools allowing describing Russian government services. The study concentrates on an overview of the present state of affairs in the Russia in the field of government services, and formulates the occurring difficulties. A method of formal specification of Russian government services is presented. The method implies choosing domain (country, state, municipality, etc.), creation ontology for domain selected in order to fix all the main concepts. For that purpose we adapted OntoGov approach (Tambouris, 2004). Basing on the mentioned ontology separate services have to be described. At that it is proposed to employ a customized BPMN notation (BPMN, 2009) (process model), extended with document and description models. Document model is described by the means of modified Feature Diagrams (Kang, 1990); for the description model we proposed to use XML. An example Web-content generation under formal specifications is presented. Finally, a pilot method deployment, at the Finnish-Russian cross-border communication project «Improving social services»[1], for specification of Russian government services, which required Russian and Finnish citizen to communicate with each other, is described.

[1] http://sites.google.com/site/improvingsocialservices/home

2 BACKGROUND

2.1 OntoGov Project

The given project is aimed for enhancement of e-government services life cycle: creation of formal e-government services description tools, maintenance and update mechanisms as well (carrying out changes starting with laws and regulations up to corresponding software). Particularly, in the framework of the project Meta Ontology approach is employed, that is creation of a set of interrelated ontologies in order to describe various aspects of e-government services. This set of ontologies includes:

- Profile Ontology includes a service name, short description, version, status, date of creation, creator, etc.
- Process Ontology models describes process flow and data flow
- Life-Event Ontology contains classification of e-government services
- Domain Ontology describes "terminology" used in the e-government domain
- Organizational Ontology describes roles and areas of responsibility, capabilities within an organization providing the service
- Lifecycle Ontology describes a decision-making process at public administration to support the transition from knowledge acquisition to implementation
- Legal Ontology models the structure of legal documents, which include paragraphs, sections, amendments, etc.
- Legal-Federal Ontology is based on Legal ontology and contains entities, representing laws that are held at federal level
- Legal-State Ontology is a specification of Legal-Federal extended with the information related to federal state laws
- Legal-Municipal ontology extends the Legal-State ontology with some regulations of municipality

2.2 BPMN

At present, there are many approaches to business processes formal description (for example, see review (Ruopeng, 2007)). Among them, BPMN stands out as, perhaps, the most mature formal notation. An advantage of the BPMN is rich graphical notation and presence of strictly executable design semantics.

The basic constructions of the BPMN are listed below:

1. Flows objects, which may be of the following types: activity, gateway, and event
2. Connecting objects, which combine different actions and data in a unified execution flow; relations may be of following types: sequence flow (transition from one activity to another), message flow (message exchange between the involved participants), and association (aimed to define transitions between activities, at exemption occurrence, for instance)
3. Process swimlanes, which may be: pools (external process environment, for example, other various organizations involved in the process), lanes (internal participants, such as functional departments of organizations involved in the process), artifacts (data object, annotations, etc.)

2.3 Feature Diagrams

Feature diagram is a set of features and their hierarchical relationships with clearly distinguished hierarchy root, which is called "concept". Feature is a detached system property, recognized from user's or developer's standpoints. Hierarchical relations reflect the decomposition concept and/or opportunities (and are the inclusion relations). Options for inclusions are of two types: mandatory and optional. There are also special properties for group relations, emerging from one vertex: (1) any subset of features selected, which is led by lines having fell in this sector (black sector); (2) choice of a single opportunity (blank sector, outlined in the bottom). Feature diagram example is presented in Fig. 1.

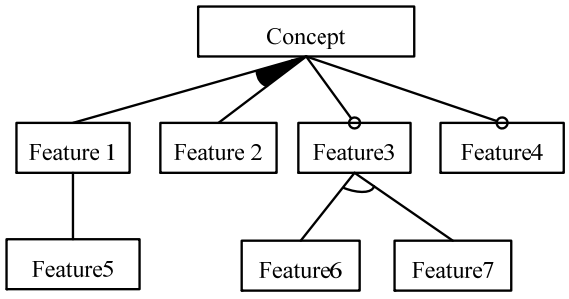

Figure 1: An example of feature diagram.

This figure proves that Feature 1 and Feature 2 can be included into the system in any combination; Feature 3 and Feature 4 may be included, and may not be; Feature 5 is always included when there is Feature 1; Feature6 and Feature 7 are a part of the system alternatively.

These diagrams have been proposed in the context of software product lines (Frank, 2010). Their main purpose is visual formalization of system divergent properties. At employment, feature diagrams must be resolved. For example, in case of product lines, this means that at specification of a certain system various features are selected explicitly.

3 GOVERNMENT SERVICES IN RUSSIA

Services provision for population is one of government/state/municipal authorities' major functions. Services system development supposes enhancement of interaction with citizens and organizations, increase of state and local authorities' activities efficiency, citizens and organizations accessibility to the information on course of execution of a government (municipal) service at each level, control over its progress.

Government services in the Russian Federation are provided basing on distinct regulations, created by the conforming governmental authorities, and contain a detailed description of service supply processes. Presently the consolidated government service register of the Russian Federation contains information on 575 federal services, and over 8,5 thousands of state and municipal (Federal document, 2008).

In 2005 the Russian government has approved an administrative reform concept (Nabibulina, 2010). One of the tasks of that reform was creating of legal and institutional mechanisms for development and maintenance of government services portals, providing free access to information about services on-line.

Summarizing the administrative reform activities of 2006-2010 the main remaining problems, demanding urgent solution, were allocated as follows (Nabibulina, 2010):

- Optimization of services classification, elimination of redundancy and duplication, commitment of lists in conforming registers
- Services regulation and standardization, reengineering of the service provision scheme itself
- Transfer to e-service upon a "one window" principle

Additional difficulties of government services

in the Russia are the following:

- Present lack of a unified (which includes all services) system of terms and definitions, which would have served as a base for laws and regulations, specifying government services
- A large volume of services descriptions (laws and regulations) hindering citizens' comprehension of the latter

Complexness of legal information, on one hand, leads to Russian Federation citizens' ignorance in the field of existence and execution of various services. On the other hand, the providing of services per se (in most cases there are no e-access!) many unnecessary delays occur, quality of service suffers. Both citizens and officials have difficulties planning and estimating execution of one or another service in a specific case, therefore, the only way to discover the amount of time and efforts to be consumed – is to follow the entire way directly.

4 METHOD

The proposed method is aimed for creation of formal government services specifications in the frames of a certain domain, basing on domain ontology and a range of models.

The Russia government services have a large branch structure aiming to cover various categories of citizens. At applying, for instance, for a child's international passport the latter may both come with a parent or with a person having a designated parent entity. Parent's last name may be the same as the child's, and may not. In all these cases a various documentation package is needed in order to obtain a child's international passport. Complexity of services description is precisely specification of these cases and subcases. Exactly in such rare branches mistakes lie. Therefore, a formal method for public services description should be designed for specification of these "branches". For diverse government services applicants the following may differ:

- Steps order and quantity
- A list of documents submitted; it often appears that a course of action is common for different applicant groups, and only the documents to be submitted differ
- Service rendering run-time; timeframes depend on the amount of steps required for completion by different categories of applicants in order to receive the service, on time period for processing of various input document packages by the authorities, etc.
- Service price – e.g. depends on services run-time

The method scheme of is shown in Fig. 2. It should be noted that specifications, which created by the means of the proposed method are not intended for services' users. Numerous studies show that model-based visual specifications are difficult for comprehension by the untrained people. Government services targeted descriptions should be produced on the base of these models in semi-automatic mode, with employment of special metaphors, denoted in Fig. 1 as WCMs (Web-Content Metaphors).

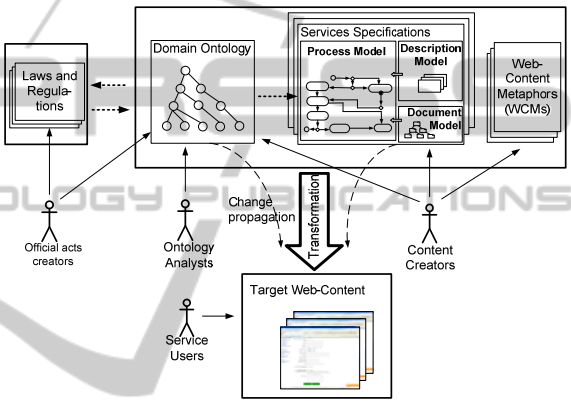

Figure 2: Method scheme.

Below proposed kinds of models are descried in more detail.

4.1 Domain Ontology

Our approach is based on the establishment of the Domain ontology for the selected domain. The latter shall contain a thorough specification of domain general terms, which are to be used at modeling of services as well as at preparation of regulations.

We have adapted OWL-S[2] for our needs. Without going into the syntactic details, we shall list the basic concepts. We have extended OWL-S with characterizing typical domains of government services in Russia (see Fig. 3): (1) a list of executive bodies and organizations involved in service providing, (2) recipients and applicants of a service, (3) laws and regulations, defining this domain; (4) documents used in services of the domain (5) results of service rendering, (6) grounds for service rejection, (7) various descriptions and concepts – e.g., for housing and communal services there are

[2] www.daml.org/services/owl-s/

types of housing, benefits and preferential categories of citizens, etc.

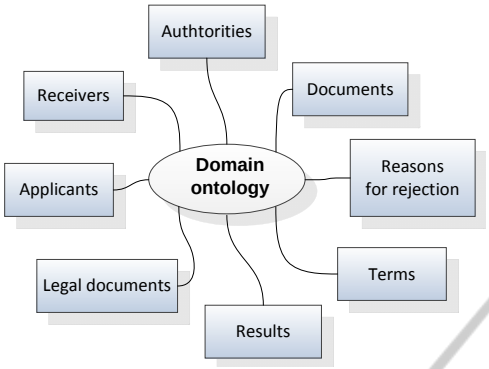

Figure 3: Domain Ontology.

Inlike OntoGov, we chose not to employ a Meta ontology approach, as we are oriented at smaller domains so far, for example, committee of regional government (for instance, housing committee). In the meantime, for instance, Saint-Petersburg government committees are actively creating numerous regulations; so according to our preliminary experiments for the housing committee, our proposed approach fits well to their data domains. However, unconditionally, if the domain turns out to be noteworthy – for instance, all Saint Petersburg government services – a more complex ontology is necessary. It would seem, in this case, we minimize costs and efforts for specification development getting an opportunity for reuse. But on the other hand, number of concepts grows and there is a problem of additional structuring. Furthermore, using of the approach in that context requires more institutional support, which is not easy to provide, and so far we don't have any experience in the field.

Another distinction from OWL-S/OntoGov is that information on government services we have partially removed from the ontology into the models: process and document models.

4.2 Process Model

For each service we propose to create its description, defining user's steps, which he/she is to follow in order to receive the given service, and also authorities' steps. Besides, a specific service process model is oriented a certain way in order to receive the service, as it is supposed to describe particular (and not abstract) steps. In the Russia for same services there are often several ways of receipt. For example, one can act independently, obtaining all the necessary documentation and turning to all of the correlating institutions. However, now in Russia increases establishment of unified centers undertaking cooperation with separate government services and providing numerous services. As an example of such centers is a Unified Documents Center (UDC) in Saint Petersburg, which delivers various services: passports issuance/exchange, car registration at the purchase, international passports issuance, etc. As an example, we shall consider a procedure of international passport obtainment at the UDC. A simplified model of documents delivery process for an international passport in the UDC is presented in Fig. 4.

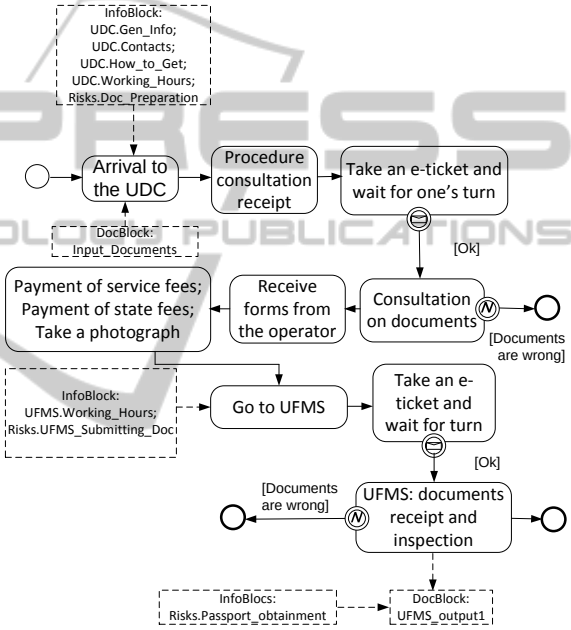

Figure 4: A process model example.

The user is needed to bring all the required documents, arrive to the UDC, and receive a consultation regarding the international passport obtainment procedure, which he/she accomplishes after that: take an e-ticket; wait for a turn to approach an appropriate operator's window to check the documents. If the documents are not in order, then the user leaves the UDC. He/she is required to obtain/update all the necessary documents and return again. In case all the documents are correct, he/she collects a receipt for state fees and services payment from the operator, makes the payment, and takes photographs as well. Having completed these steps he/she moves to the next room, where a UFMS branch office is located (state agency for registration of international passports, while the UDC is a private commercial organization) and submits the

documents.

This procedure contains a large amount of additional information, which the user should know beforehand in order to accomplish it successfully. In the first place, this is an accurate list of documents to be submitted for international passport obtainment. Secondly, it is information about the UDC: general, contacts, route, working hours, etc. In the third place, possible risks should be described. In this case, the user risks to fail submition of documents set in one visit (the documents brought are incomplete, or he/she simply arrived too late).

BPMN has data object construction that can be used for documents specification and assigning to the process activities. For additional information BPMN annotations may be used. However, in our case both documents and additional information turn out to be voluminous and elaborately arranged. Therefore, we propose additional modeling tools for their specification. Thus, to the process model we introduce additional structures denoting references to fragments of document model (DocBlock) or description model fragments (InfoBlock).

In addition, we append the ability to place several similar actions into a BPMN-activity. In Fig. 4 the fourth object is such an activity, which includes fees payment to the UCD and state fees, production of photographs.

At creation of a process models it is important not to overload it with basic information, which user can easily receive at the spot. For instance, there is no need to define such activities as «Go to the operator's window», «Attach a photo to the application», etc. On the other hand, there is also no need to achieve complete algorithmic accuracy of the process model. For example, after mistakes in the application package were discovered at «Consultation on documents» activity execution and after having exited it (in our case this is performed with deletion), the user is still able to cover the UDC services, pay state fees, and take photographs, however, this option is not present in the current model. Such accuracy complicates the specification greatly, but does not make it more informative for the user.

4.3 Document Model

Depending on individual features (special attributes' values) the user should provide various documentation packages in order to obtain the same service. To define all possible options we propose a document model, based on Feature Diagrams. It represents a forest of trees. Presenting attributes' values, a user receives a selection out of many and obtains a documents package suitable for one's situation.

Fig. 5 shows a fragment of such model for the process model introduced in Fig. 4. We consider an «Input_Documents» tree (as follows from Fig. 3, there is one more tree – «UFMS_output1») that is presented in Fig. 5. This only a fragment of real model: for example, the situation of citizens whose age is below 18 is not considered.

Each tree in a document model contains:

- A root (darker oval at the diagram)
- Intermediate vertices (lighter ovals) correspond to values of users' attributes, for example, «Age over 18» or «Age below 18»; attributes are depicted in square brackets (for example, «Age» and «Military service relation») and connected to groups, which would be defined below
- Terminal vertices – documents (document name and underlined with a thick line)

Documents can be attached to any intermediate vertex, as well as to the root of the tree. If the documents are connected with a vertex that has a subtree of situations, it indicates that all the documents are necessary for the situations located in the its subtree. For instance, in Fig. 5 attached to the root is a list of documents – and these documents are mandatory for all citizens wishing to obtain an international passport. Depending of applicant's specification this list may be extended with other documents in accordance with the «Input_Documents» tree.

Intermediate vertices, having a common parent, gather into groups, marked with attributes. Within a group vertices are alternative: i.e. must be chosen only one of them (simple group) or, as in the «Military service relation» group – one or neither (this kind of group is marked by double circular segment of a circle that encompasses all the lines leading from the node to the group). A vertex would have more than one group, for example, «Input_Document» has two groups, which are marked with attributes «Kind of passport» and «Age».

If we have selected any value of the attribute and fallen into a certain vertex, then all the groups of this vertex are necessary. That is, for example, for the «Over 18» vertex it would be also important is the person works, and his relation with military services. Finally, documents may be marked with a circle, which means that they are advisable, however, not mandatory. InfoBlocks, providing additional information about the situation/document, may be

connected with tree nodes.

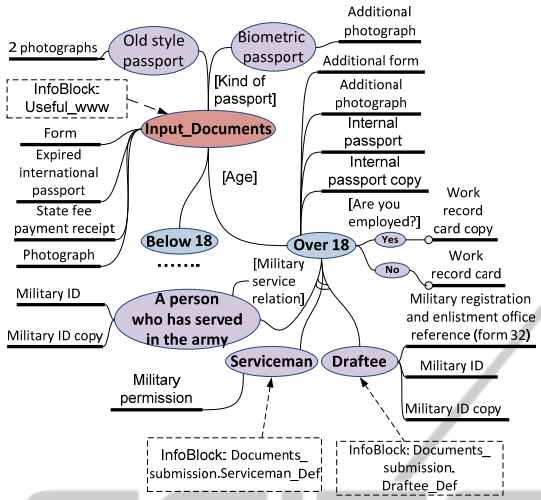

Figure 5: A document model example.

4.4 Description Model

This model is designed to structure diverse useful information, which the service user may need. We suggest packing this information in separate thematic blocks (InfoBlocks). InfoBlock is an XML-text. Here's an example.

```
<service name = “International
passport_registration “>
   <InfoBlock name = “Center”>
       <section name = “General_Information”>
Saint Petersburg Unified Documents Center is
designed to accelerate registration of various
documents – international passport, vehicle
registration, vehicle purchase agreement,
driver's license registration and exchange,
etc. For more information visit Center’s
website http://www.7771000.ru/
   </section>
      <section name = “General_Information”>
Address: Krasny Tekstilshik St. 10-12
191124 Saint Petersburg
Tel: (812) 777-1000
Web: http://www.7771000.ru
      </section>
   ……
   </InfoBlock>
   ……
   </service >
```

Process and document models may refer not only to entire InfoBlock but also to its sections, as shown in Fig. 4 and 5: for example, in Fig. 4, at the «Arrival to the Center» activity there is a link to various sections of the «Center» InfoBlock.

4.5 Transition

Formal specifications of government services can be used for automatic generation of Web-description for these services, making such knowledge explicit and understandable. Various metaphors and approaches are to be used in order to make information accessible for the different kinds of users.

As an example let’s view how we can automatically generate windows forms to specify the exact document package to submit. These forms can suggest the user some questions with predefined answers. Basing on these answers the final document list will be formed. All information for these forms can be provided by a document model. Each group of forms corresponds to one document tree. Questions are names of groups (attributes), answers are names of situation of these groups (attributes’ values). Documents, which the user has selected, are attached to the vertices attending user answering the questions. An example one of the forms that correspond to the document tree from Fig. 5 is presented on Fig. 6.

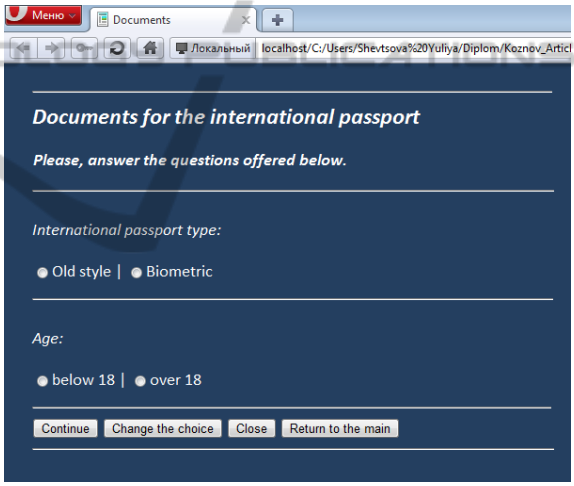

Figure 6: An example of generated dialog window.

5 CASE STUDIES

We have applied the method presented for specification of government services in Finnish-Russian project «Improving social services» in cooperation with Saint Petersburg government. The overall objective of the project is to contribute to social development of St. Petersburg (Russia), Imatra and Lappeenranta (Finland) regions through improving access to on-line social services for Finnish and Russian citizens by developing and testing of a new customer friendly Web-based approach.

Up to now we have created specifications for

five Russian government services: international passport obtainment, foreign citizen registration, foreign citizen work permit obtainment, car accident analysis, obtainment/renewal of Russian visas for foreign citizens. Generally, the process model occupied one or two A4-format sheets, document model (one A4-sheet), description model (5-10 pages). A relatively small amount of specifications contrasts with intricacies of official regulations. The created specifications were inspected by the Saint Petersburg authorities' specialists and corrected under their remarks. Basing on the models we have also created several pilot Web-sites in order to present model information with an interface convenient for end users.

We have also noticed that not all the information concerning government services, the users require, is possible to formalize in models. In the future, we'll intend integrate Web-descriptions of government services with Internet forums, where people would be able to share their experience of relevant services obtainment.

6 CONCLUSIONS

The paper discusses some preliminary steps, which can be done for transition to e-government services in Russia because it is not possible to create IT services basing on incomplete and contradicting information. One of the ways to solve this problem is to use formal specification method. We have presented such method that takes into account Russian specifics, and the main one is an urgent need for a uniform formal description of government services. We believe that even within small domains (for example, Saint-Petersburg house committee), this activity may be beneficial, especially since implementation of such methods is often held step-by-step. However, we also believe that the described method can be applied outside of Russia as well, since difficulties organizing government services and provision of additional informational resources for usual people are, on different scale, characteristic for each country.

Directions for future the method development are as follows.

1. Method employment for specification of voluminous and complex public services (yet it had been employed for relatively small ones).
2. Model expanding with timing and pricing, in order to execute various users' requests basing on that data.
3. Search for effective Web-metaphors for end user Web-content generation under the models.
4. Basing on a certain standard CMS-system, development of a site builder, allowing in a semi-automatic mode construct Web-sites with services description from standard blocks, grounded on models.
5. Solving problem of Web-content maintenance and update.
6. Using the method for design and development of e-services.

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