Efficient Approach for the Development of Metadata Editors by Metamodeling Strategy : A Survey

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Abstract

Metadata is information about the date that describes, specifies, or makes it easier to reclaim, utilizes or deals with an information resource. The latest version of the metadata standards that supports the metadata editors. To make certain correct and appropriate use and understanding of the data. We use metadata standards are requirements which are deliberate to ascertain a common indulgencing of the meaning or semantics of the data. The barrier for this invention of the metadata is the miscellany and heterogeneity. The main goal of our ongoing research is the Model Driven Architecture for the development of metadata editors for geographic information resources, in order to more focus on the generic action of metadata model than on the enlargement of the specific edition form of a reduced set of metadata standards. It could help to improve the efficiency and interoperability of any metadata editors using metamodeling development strategy. In this paper, intended to learn and evaluate various approaches of metadata modeling strategy.

Keywords-*Spatial Data Infrastructure, Metadata, Ontology, Eclipse Modeling Framework, Data Access Service*

1.INTRODUCTION

In order to use spatial data in an efficient and flexible way, the data infrastructure implementing a framework of geographic data, metadata users and tool that interactively associated. That is called Spatial Data Infrastructure (SDI) [1].Spatial data also known as geographic information which is the core component of Geographic Information System. One of the successes in the enlargement of SDI or other information infrastructure is the suitable of resources to be accused means of metadata. Metadata is a detail about data. To characterize data and service these mechanism constitute the metadata. That means to describe the content, quality, other information etc.. Diversity of metadata standards has become a barrier for the invention of the metadata also the heterogeneity. We cannot consider a unique metadata model because of heterogeneity and diversity of these metadata standards.

During last year's there is lots of metadata standards that proposed by our standardization bodies such as CSDGM [2], ISO 19115 geographic information [3], The Dublin core metadata [4]. Nowadays the desktop and web based metadata editors needs are increasing so that , to manage their multitalented standards and provide other functionalities like international interface, online help, validation of standard conformance and serialization to XML or other semi structural format.

The content has changed the higher level of abstraction in the SDI of the annotation tool. Metadata which keeps to understanding the structure of the model also the component, so it's called focus point of the management. Although most of the editors, that has an available documentation it does not expose an interesting on metamodels. These tools are the key component of describing the metadata standards. The software used for editing metadata in conformance to these standards that can be adapted dynamically. From the underlying platform the activity of modeling more separated. In our real world our expert more focus on the defining reusable models, acquiring specific knowledge about the system.

2. MODEL DRIVEN ARCHITECTURE

Javier Nogueras-ISO et.al., Introduced a model driven approach(MDA) [5].It is a software design approach for the development of software systems. It provides a guideline of specification, which expressed as a model. In MDA approach has four phases.

First Analysis of Metadata standards that should be understood as a Computational Independent Model. CIM does not show details of the structure which focus on the environment and requirement of the system. To express special features several stereotypes have been defined.

The second model is the Platform Independent Model, which focus on the operation of a system. System specification does not change one platform to another. Because of disregarding of UML specification, conflicting data type and automatic serialization of metadata in XML format, in the PIM model proposed a domain specific language using an Eclipse Modeling Framework (EMF) [6]. This metamodel has been built by means of Ecore format.

The third model is a Platform Specific Model. This modeling specifies the transformation of the PIM model into the PSM model. The first model is the edition forms and second model is the representation of controlled vocabularies. A simple knowledge organization system for the representation of controlled vocabularies. SKOS representation using the Resource Description Framework RDF [15].Last phase is text generation using MDF script rule GUI model transforms to XML file, as well as a SKOS vocabulary converted to SKOS_RDF file.

3.MODEL INTEGRATED COMPUTING.

Greg Nordstrom et.al., Proposed model integrated computing MIC [7], which is based on the models. model used to evaluate and develop a large-scale software system. It effectively maintaining computer based system applications. Such model is tightly coupled to the system development cycle model. The final models which is used to generate necessary software components.

In the first step modeling paradigm is developed. The modeling paradigm specified in the aspect of the system, behavior or environment i.e. what is to be modeled, how they are constructed i.e. Syntactic and semantic specification of modeling language finally models are to be used.

The metamodel that specifies the domain specific modeling environment to be constructed for a specific domain. Metamodel created by MIC expert. Then it passes into meta-level translation process. The output of these levels is configurable model editing tools, these tools are graphical, and support modeling of the application domain. The domain model is saved in database. In order to use the model very effectively and efficiently we use tools for transforming an abstract model and runtime support libraries. The model interpreter is used for transformation. The domain- aware end users used the modeling and application synthesis tools.

4.ONTOLOGY DEFINITION METAMODEL (ODM)

Dragan Djuric et.al., Pioneered the Ontology Definition Metamodel (ODM) [8]. This model used in real world applications and it successfully support software tools. metamodel that specify using modeling language. Defining an ontology modeling language specifying in the basis of the meta object facility (MOF).It supports modeling tools, management, interoperability with other MOF metamodel. According to the request for proposal (RFP) our ontology definition metamodel architecture generated. It is the scope of MDA.

First is the Ontology Definition Metamodel which designed for ontology concept. The ODM starts with OWL (Ontology Web Language).OWL are the existing ontology languages. ODM has a UML profile so we can use the graphical modeling capabilities of UML. We can edit the UML diagram. XSL transformation done by using UML model and ODM model. These two models are in XML format, so the two-way transformation is done. It helps to ODM and OWL two way mapping.

5.VIEW-BASED MODEL DRIVEN DATA ACCESS ARCHITECTURE (VMDA)

Christine Mayr et.al., proposed a view based model driven data access architecture(VMDA)[9]. The UDMA provide some contributions.DAS which is independent of the underlying data sources, DAS repository [10] which is used to manage DAS view model. DAS repository provides a query service to manage the view model and discover DAS. It is retrieved both query and query service instances.

After registering a view model or a view model instance some registered people has permitted to query, the information in order to test registered views, registration service invoke build/ deploy service . It uses a view-to-code transformation in order to generate source code.

After testing DAS/DAO, view selected person, team, department etc. DAS repository clients publish the DAS views. After DAS is published it queried by extending user group. The publication service invokes the synchronization services. This may occur DAS end point; it stored both repository and service repository. The running on a specified DAS provider endpoint can invoke the deployed DAS by business process application.

6.WEB ONTOLOGY SERVICE ARCHITECTURE

Lacasta J et.al., Proposed a web ontology service to facilitate interoperability within a spatial data infrastructure[11].An ontology which used to improve data sharing and information retrieval. The WOS based on the OGC Web Service Architecture [12], its manage and use the lexical ontology collection of metadata records also will consider.

The architecture of WOS consists of 3 layers, first repository layer. In repository layer that stores the ontologies. Second layer, application layers that access to ontology services and metadata. Third layer is service layer that provides a web services. A Simple Knowledge Organization System (SKOS) model used for storage and exchange ontologies. A SKOS vocabulary uses the web ontology languages (OWL) [14]. Jena is a library that stores the RDF SKOS document, that storing the text file or in a database.

In repository layer the metadata considered as basic information that facilitated to the client. This metadata called Ontology Metadata. In service, the ontology describes basic of Dublin core. The metadata manager and Jena API integrate disambiguation tool that enables lexical ontologies with respect to core upper lexical ontologies .

7.AUTOMATIC SPATIAL METADATA UPDATE: NEW APPROACH

Hamed OLFAT et.al., proposed an automatic spatial metadata update[13]. In this new approach, the metadata create and update in the required format. The format like shape file, CAD file etc. The new approach is based on Geography Markup Language; it helps to the synchronization process. The dataset transformation to GML then to implement this GML application schema should be designed to encode. The data integrated in the thousands of format. So data uses extract format, transform and load platform. It helps to solve the problem like interoperability challenges, also the data format, integration and distributing data.

After the data set in GML format then GML document identified using specific standards. Finally written in an XML document format. The output also depends on transformer application design. When the metadata updated at the same time spatial data updated.

8. EVALUATION AND COMPARISION OF METHODS

MDA approach for the development of annotation tools, which can be customized to different metadata standards and profiles with minimum effort. Focused on metadata model that using Domain Specific Languages.

MIC shows lots of recompense, software engineering processes that promotes designing for changes, the point solution that captures and representing the relationship between problems and solutions, and it deals with the end user programmability. One of the critical issues in system acceptance is domain specific modeling The future work will focus on the mapping the abstract syntax of a metamodel.

The ontology definition metamodel which closes to software engineering practitioners. ODM defines as a MOF and it share the ontologies using XML as well as its store in repositories. Our proposed ODM which based on the OWL. The future work will be based on UWL profiles and UML notations in the UML modeling. Several stereotypes will be included in the UML profile. The Java metadata interface also developing in the future it helps to create access, store and exchange the ontology using Java interfaces.

VMDA supports, one DAS implementation which is scalable, second its support tailored view of different stakeholders. This approach helps with productivity and maintainability. It specifies the documentation gap between DAS and Data Access Object (DAO), storage schema also improves the documentation relation between them. As the number of software components grows, the number of DAS increases with development complexity. The retrieval quality is very low because of development

complexity .Advanced searching capabilities not good.

Web ontology service architecture shows have integrated the service in order to obtain a better classification of resources and improve the information retrieval performance. It is an automatic expansion of user query concepts. As future work, query expansion of metadata records may include, also prune the lexical ontology and obtain a thematic map. The final thing resource visualization or access.

In our new approach Geography markup language is used. It would benefit the synchronization process. It saves time, resources and efforts. It helps to automatic updating of metadata. But the efficiency is less than compared to other methods. It's only for updating. This approach extraction spatial data element from the GML document when it's compared with metadata standards ISO 19115 metadata element that will be the future work.

9. CONCLUTION

Here in this paper various approaches for the development of metadata editors are presented. Among this most methodologies require the most efficient approach for the metamodeling, development strategy. Here there are six methods which compared to the selection of efficient metamodeling. This paper takes the advantages of all the six methods and uses in modeling approach. Among the different methods MDA approach is superior to others. It can apply both web based and desktop applications. Most of the future work of the other methods include in the MDA approach. So it is the most modern and efficient method also generates optimum result.

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