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A Novel Approach for the Development of Metadata Editors in Web-based Applications

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Abstract: ***Metadata is the data about data which describes how and when particular data was collected and how the data should be formatted. Metadata Standards that support a number of defined functions, and specify elements which makes these possible. The metadata editor's supports metadata standards but heterogeneity and diversity of metadata standards became barrier for the generation of these metadata. A Model Driven Architecture (MDA) used for the development of these metadata editors. This MDA approach more focus on the metadata model. This strategy helps to improve the efficiency of metadata model. In the web based application various platforms are used and models are the concept of metamodel to support for multiple standard.***

Keywords: ***Spatial Data Infrastructure (SPI), Model Driven Architecture (MDA),Model Driven Engineering (MDE)***

1.INTRODUCTION

Spatial Data Infrastructure (SPI) are special type of information infrastructures [1]. In order to use spatial data in efficient way, geographic data should be implemented a framework.SDI are the core component of geographic information system. One of the successes in the SDI or other type of information infrastructure is accused by means of metadata. Metadata is the data about data; it can apply to data, services and other resources type. The Diversity and Heterogeneity of metadata standard became the barrier for the generation of metadata, so we cannot consider a unique metadata model.

There is lots of metadata standards proposed by standardization bodies, Content Standard for Digital Geospatial Metadata (CSDGM) [2] or ISO 19115 Geographic Information — Metadata [3]. Additionally, apart from that , the Dublin Core Metadata Initiative [4]. According to ISO/IEC 11179 [5] using this metamodel understanding the structure and component of model. The available documentation of editors not expose interest on metamodel. To manage these complex standard and provide functionalities, increasing the need of desktop or we based application of metadata editors. The flexibility and model abstraction is leading the development of metadata editors, not directly indented and very close to Model Driven Engineering (MDE). MDE focus on the model to model transformation [6]. So we follow a systematic acknowledged methodology called Model Driven Architecture (MDA) [7] MDA consider interoperability issues and data access service also give attention for the development of metadata editors.

To provide the guidelines and framework to complete the development of metadata editors using MDA, which decreasing the effort at same time increasing the efficiency and flexibility [7]. This method presents the different model like Platform Independent Model (PIM), Platform Specific Model (PSM), PSM edition form and controlled vocabularies then finally PSM to code.The rest of the paper is structured as follows.section2 Related work. Following this, Section 3 describe metadata editors with multiple format data in web-based applications. Section 3 describe results, Section 4 describe conclusion.

2. RELATED WORK

Increasing importance of geographical metadata, numerous methodologies have appeared during last decade for the creation of metadata Efficient Approach for the Development of Metadata editors by Metamodeling strategy: A survey [8] provide detailed reviews of various methodology used in metadata editors. A model driven approach for the development of metadata editors [7] is the latest approach used for the geographic information resources.MDA approach which can e customized different metadata standards and profile with minimum effort, also increase the efficiency. The future work is the development of metadata editors with multiple format data in web-based applications.The next method is the Model Integrated Computing [9]. MIC shows large number of recompense. It leads with end user programmability. Domain specific modeling is the critical issue and future work is mapping abstract syntax of metamodel. The Ontology Definition Metamodel [10] is very related to software engineering practitioners.ODM defined using Meta Object Facility. It share using XML and it store in repositories. The future work is based on UWL profile and UML notation. Next method is view-based model driven data access architecture [11]which support scalable data access services implementation and it support different stakeholders. This approach helps to increases productivity and maintainability, also helps to specify the documentation gap between Data Access Services and Data Access Object. Advanced searching is not very capable also retrieval quality is very low because of development complexity

Web Ontology Service Architecture [12] shows to obtain a better classification of resources have to integrated the services. It helps to improve the information retrieval performance. One of the main advantages is automatic expansion of user query concepts. Query expansion of metadata records, obtain a thematic map are the future work. Automatic spatial metadata update [13] Geography markup language is used. The major benefits are synchronization process, saves time, resources and efforts and automatic updating of metadata. But the efficiency is less. This approach extraction spatial data element from the GML document. It is compared with metadata standards ISO 19115 metadata element that will be the future work. Compare these six method MDA is the efficient approach, other papers are old methodology, so most of the future works mentioned in above methodology included in MDA approach. The future work is the development of metadata editors with multiple format data in web-based applications.

3. MDA FOR WEB APPLICATIONS

MDA is suitable for developing distributed systems. That are made up of components running on different platforms. The web tier implemented on ASP. Net. In this web based application various platforms are used. The configuration of a new metadata standard in this Web-based tool. Using the J2EE technologies requires the inclusion of an XML Schema for the syntax, and different XML and XSL files to adjust the edition interface, the internationalization to different languages and the indexing and searching capabilities; M3Cat uses the concept of metamodel to provide support for multiple standards. The definitions of metadata elements are stored in a RDBMS. The Web-based interface of the tool creates dynamically the edition forms following the standard structure; the design and implementation of this Web-based tool draws on the concept of metamodeling. The genericity of the metadata database resides in the originality of the relational schema that describes a structure at a Meta level coupled with a standard structure.We using the MDA approach in we based application.

3.1 MDA approach for the development of metadata editors.

Model-driven architecture (MDA) is a software design. This approach used for the development of software systems. It provides a set of guidelines for the structuring of specifications, which are expressed as models.MDA defines three model on system. First Computational Independent Model, CIM does not show details of the structure of system. It focus on environment and requirements of the system. Second Platform Independent Model, PIM focus on operation of a system. System specification does not change from one platform to another. Third Platform Specific Model, It show how the system uses a particular type of platform.

The first phase is the analysis of metadata standards that is in terms of their conceptual schema languages. It shows how the system should be present. The Meta Object Facility provide a type system, type system is a collection of rules in programming languages which assign a property called a type to various constructs.

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The definition of PIM model is the second phase. The syntax and semantics of metadata standards distributed in heterogeneous documents. Some of the documents are UML model, but in another case this is just a plane documents. To apply MDA for the development of metadata editors, we need machine readable standards and a unique document. The PIM is independent of the specific technological platform. Because of these three reasons the new language is introduced in our approach. The disregarding of UML specification. Second is conflicting data types are an obstacle. These obstacles for the direct integration of these models. Third one is automatic serialization of metadata in XML format cannot be directly inferred. So we proposed common metamodel for PIM model. This model has been built by means of ECORE metamodeling language.A platform-specific model is a model is linked to a specific technological platform. In PSM model the first model is based on the definition of the edition forms and second model is representation of controlled vocabularies. In PSM model for edition forms, the edition interface focused on a particular entity of the profile. Graphical User Interface Language like XUL, Swing Markup Language allow user interface by means of wide range of widgets. There is high difference between high levels to low levels GUI widgets.

Using Simple Knowledge Organization System (SKOS) for the representation of controlled vocabularies. Knowledge Organization System that represent the knowledge to improve data sharing and information retrieval. SKOS seem to be most promising representation of this Knowledge. SKOS is a standards to support Knowledge Organization System such as thesauri, classification schema etc. SKOS provides a standard way to represent knowledge organization systems using the Resource Description Framework (RDF).The problem is that monolingual and multilingual thesauri did not include a standardized representation formats so RDF-based languages such as SKOS, this XML representation limits its applicability for the publication of controlled vocabularies. I.e. in order to create a accurate metadata use controlled vocabularies to fill the content of typical key word. It increases the Homogeneity.MDA adopt Unified Modeling Language [14] to describe PIM and PSM.The last phase is transformation of PSM models into textual representations. In edition form GUI XML transform into XML file, SKOS vocabularies transform to SKOS-RDF using MOFScript rule.

At last we can download the xml file. Each of the phase we can downloaded the xml file. That means at the end of Platform Independent Model we can download the generated xml file. Like wise converted to PSM corresponding XML file generated and downloadable.

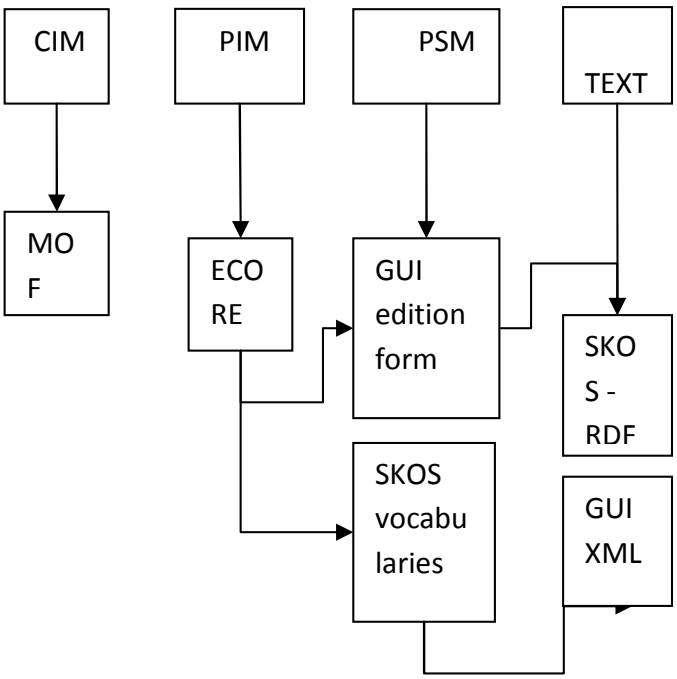

Fig: MDA approach for the development of metadata editors.

4.RESULT AND DISCUSSION

The performance of the system is evaluated by parameters. The performance parameters are number of format or syntax supported and conversion error rate. From the experimentation, we obtain high performance in our web based application. The conversion error rate is reduced. it has more efficient than the existing system. At the end, XML file generated and downloadable.

5.CONCLUSION

The MDA approach adapt to metadata standards and profile with minimum effort. Applying this approach metadata standards focus on the metadata model using domain specific language. The MDA approach is applicable for the development of desktop application and web based application. The development of metadata editors with multiple format data in web-based applications using MDA approach increases the efficiency of model. This MDA approach successfully applied for editing metadata for geographic web services .The infrastructure for the PIM and GUI-based PSM model was reused. Many sceptical positions and critiques are there, and no manual coding. We need to identify the domains in which MDA can be effectively used. Domain develop tools for it so we can say that MDA not panacea.

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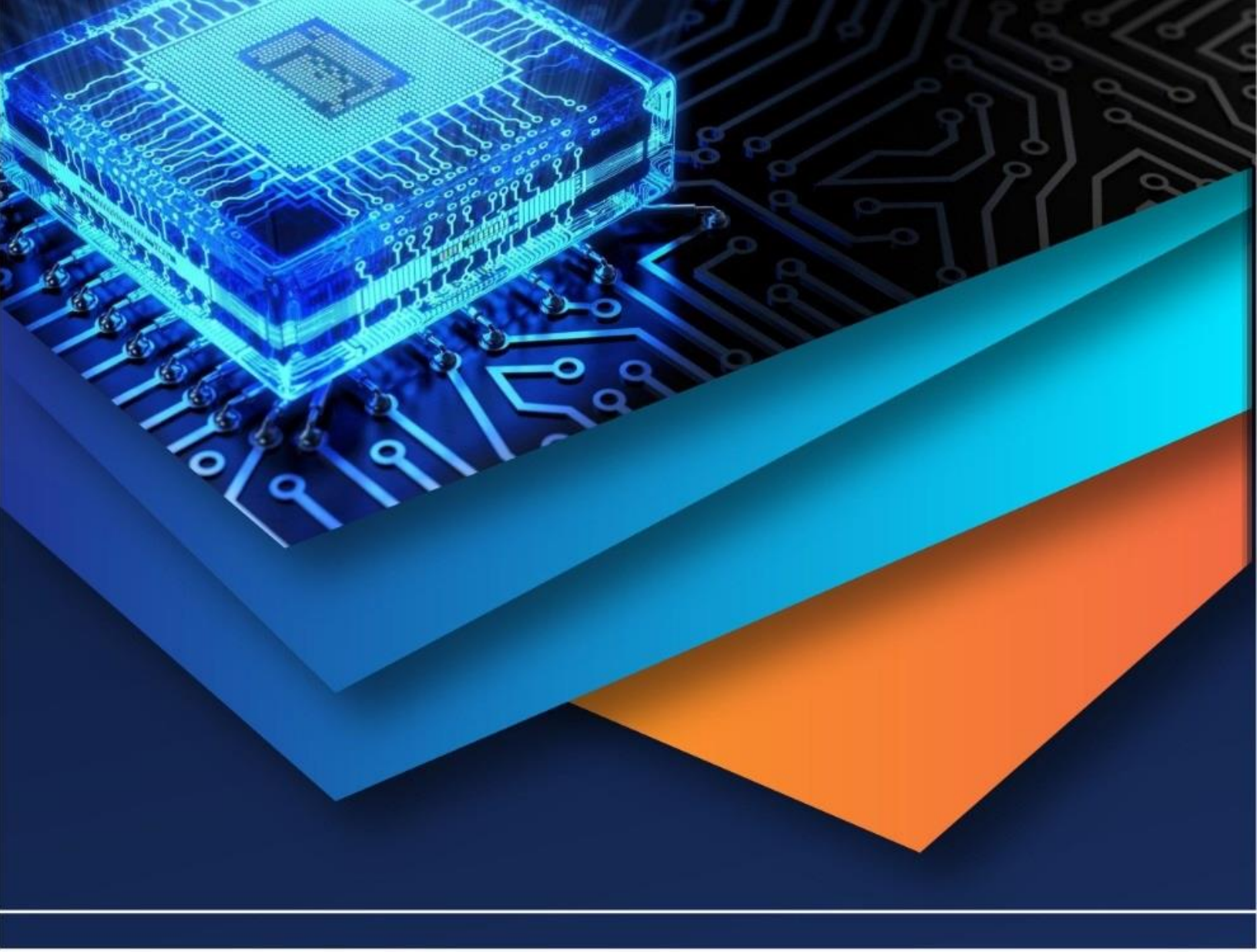

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