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127

Converting Relational Database Into Xml Document

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Abstract

XML (Extensible Markup Language) is emerging and gradually accepted as the standard for data interchange in the Internet world. Interoperation of relational database and XML database involves schema and data translations. Through EER (extended entity relationship) model can convert the schema of relational database into XML. The semantics of the relational database, captured in EER diagram, are mapped to XML schema using stepwise procedures and mapped to XML document under the definitions of the XML schema.

Converting Relational Database into XML Document is a process of converting the existing databases into XML file format. Existing conversion techniques convert a single database into xml. The proposed approach performs the conversion of databases like Ms-Access, MS-SQL to XML file format. Read the tables information from the corresponding database and generate code for the appropriate databases and convert the tables into XML flat file format. This converted XML file is been presented to the user.

Keywords: Relational Schema, XML Schema, SQL, EER, Conversion, Encoding.

1.Introduction

XML (Extensible Markup Language) is a markup language that defines a set of rules for Encoding documents in a format that is both human-readable and machine readable. XML has been widely accepted as a data format standard for information exchange and storage with the rapid development of internet and web services. It is defined in the XML 1.0 Specification produced by the W3C. The design goals of XML emphasize simplicity, generality and usability over the internet [14]. Significance of the XML is XML seen as a universal, open, readable representation for software integration and data exchange [16].

A Relational database is a means of storing information in such a way that information can be retrieved from it. In simplest terms, a relational database is one that presents information in tables with rows and columns. A table is referred to as a relation in the sense that it is a collection of objects of the same type (rows). Data in a table can be related according to common keys or concepts, and the ability to retrieve related data from a table is the basis for the term relational database. A Database Management System (DBMS) handles the way data is stored, with constraints, maintained, and retrieved. In the case of a relational database, a Relational Database Management System (RDBMS) performs these tasks [15].

Recently, the research on XML document is focus on three methods. The first method is to store XML document as Text into XML database, but it's not convenient for data query. The second method is to store XML document into relational database because relational database is mature. In this method, the mapping between XML Schema and list in table is con structured. But the question is how to deal with the mapping when XML schema is changed. The last method is store Relational database data into XML document. That is an object-oriented database and it's not mature.

Using Relational database to save and manage XML data can bring many advantages for different users. Nowadays relational database is the mainstream database, changing XML data into relational data can not only reserve the specialty of easy to express and independent of platform in the aspect of XML at data application, moreover may fully using the mature data management service of relational database(effective memory, highly effective inquiry, concurrent control, data restore and so on), so making up the obvious shortcoming of XML technology in the aspect of searches, modification, achieving the goal of effectively manages and protects the XML data[4].

2.Related Work

XML data format could be used with relational database by various ways. Some database management system (Oracle or Microsoft SQL Server) support XML data type[19]. While few databases are native XML databases. However there are many relational database management

systems that currently do not support XML data type. Another issue to be considered is, there is no standard way to access XML data type in database. Oracle and SQL server use different technique to access XML data type stored in their database. Two ways to store data in XML format into database are to store content only and to store structure and content of XML file into database [20].

There are three important approaches to modeling semi-structured SGML data. They are Traditional information retrieval, relational model and object-oriented approached by Sacks-Davis[1]. Wang Xiaoling[2] proposed a method based on genetic algorithm for XML document storage to seek the optimum mapping relational between XML Schema and relational database table. The XML schema will provide a means of using XML instances to define augmented DTDs. The Transformation adopts a database reverse engineering approach. proposed by Joseph Fong, Francis Pang[6]. Keyword- search method of hybrid XML-Relational databases to retrieve information on both XML data and relational data, a new operator XRjoin, which joins XML data with relational data proposed by LiruZhang[3].

 XML Normalization has been researched and a novel expression of XFD is proposed by Xiangguo Zhao[8]. XFD and the relationship between key and relative key are indicated, a group of expression methods is proposed. The main works are construct the through research on XML storage theory based on the XML Schema and introduce the way of store XML data in the relational schema in detail, propose the method of create XML tree and algorithm of storage of XML data proposed by XIE Yi-wu[5]. Josephine Cheng and Jane Xu[7] discussed an end-to-end solution for storing and retrieving XML document for both business-to-business and business-to-consumer (via browser) processing using DB2 UDB XML Extender and DB2 UDB Net.

Fong[6] provides access for single database conversions. Databases are widely used at present in all sorts of resources, these databases occupy part of memory in the server and amount should be paid to maintain these databases. The amount will depend upon the database size, and also Access, SQL and Oracle database are platform dependent.

XML is platform independent. While using database, lot of problems will be arise[17] they are

> - Data Corruption
> - Complex
> - Huge Memory Spaces and
> - Unnecessary expenses for database security.

An Xml database addresses these issues. Now a day's most of the websites stores data in backend storage device. The data are stored in Oracle database or some other backend devices. Replication of database and backup of database has to perform on a time to time basis as it consumes large amount of memory.

3.Proposed System

This approach performs the process of converting the existing database into XML format. Converting relational databases likes MS-Access and MS-SQL to XML file format. For example user runs a firm their companies with different databases respectively. The user wants to convert the entire database into a single database. Conversion of a database to another database is a huge process and a complex one. In such case this approach convert the entire database into a XML file and then it is to a single database. By doing so, the conversion is been made easier and the native database also will remain unchanged. Only the authorized person is allowed to access the databases and select the type of database. After selection, the user is been prompted for database name and then corresponding tables present in that database is been displayed from which the user can select the table which the user wants to convert.

Before conversion, the user can view the table from that the user can check whether the correct table is been selected. The table is been converted and a message will be displayed to the user about the conversion. The converted file will be in the XML format and it is been previewed to the user in the database format after conversion. Here, the user can check whether all the fields in the table are converted. While converting the data's in the tables, the tables present in the database remains unchanged and the fields from the tables retrieved are subjected for XML conversion. XML flat file format is used as an intermediate for the Database conversions. Following modules supporting to perform the task.

> - Server Access
> - Retrieval of Tables
> - XML Code Generation and
> - Preview of XML file.

3.1 Advantages

The XML is a text formatted flat file, so this method has an ability to store any kind of data from the application system. Apart from this no proxy server or firewall can restrict xml formatted data's. XML has more advantages over other databases such as [17, 18].

> - Machine readable
> - Platform independent
> - Less Administrator support
> - No data loss
> - Enhanced security

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www.IJCSI.org

129

- ➢ Occupy less memory space
- ➢ No need to pay money for maintaining the database
- ➢ Accessing will be fast while processing data
- ➢ Reduce the Human effort
- ➢ Cheap: Using a flat file database costs practically nothing because data is stored as text files. No software is required other than the program that needs to access the data.
- ➢ Platform Independent: Since text files are universally accepted by all server platforms, there is no problem moving your databases from one server to another. and
- ➢ Very Simple to Understand: Records in a flat file are stored in one straight line and are separated by delimiters.

3.2 Algorithm

```
ds : Dataset
dt : DataTable
abs : String
mfs : FileStream
mxw : XmlTextWriter
  begin
      if ds!=null then
          abs = server.MapPath(filename);
          mfs = abs(create);
          mxw = mfs(Encode);
          ds = mxw;
      end
```

This algorithm represents the basic conversion process, based on the algorithm following conversion will be like MS-Access to XML and MS-SQL to XML.

3.3 MS-Access to XML

string a = TextBox1.Text;

string b = TextBox2.Text;

OleDbConnection con = new OleDbConnection("Provider=Microsoft.Jet.OLEDB.4.0;

Data Source=" + a. ToString() + ".mdb;Persist Security Info=False;user id=Admin;");

con.Close();

OleDbDataAdapter adp = new OleDbDataAdapter("select * from "+b.ToString()+"", con);

DataTable dta = new DataTable();

adp.Fill(dta);

DataSet ds = new DataSet();

ds.Tables.Add(dta);

WriteDataSetToXmlFile(ds, ""+b.ToString()+".xml");

3.4 MS-SQL to XML

string a = TextBox1.Text;

SqlConnection con = new SqlConnection("Data Source=KRAJ-PC\\SQLEXPRESS;

Initial Catalog=newdb;User ID=sa;Password=password");

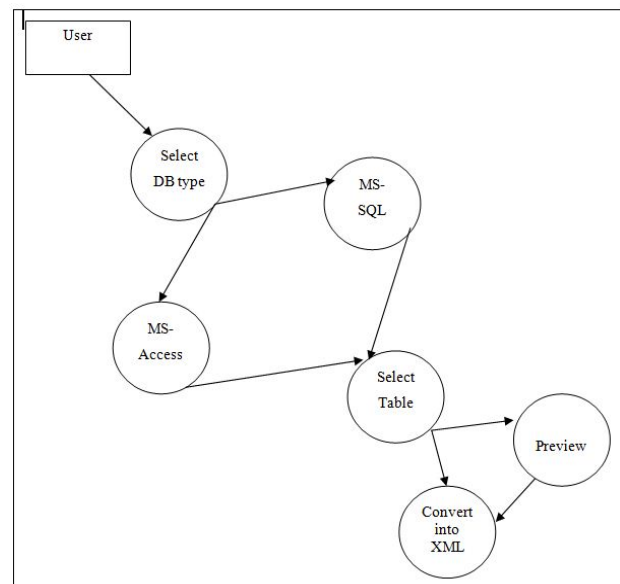string b = DropDownList1.Text;

SqlDataAdapter adp = new SqlDataAdapter("select * from " + b.ToString() + "", con);

DataTable dta = new DataTable();

adp.Fill(dta);

DataSet ds = new DataSet();

ds.Tables.Add(dta);

WriteDataSetToXmlFile(ds, "" + b.ToString() + ".xml");

3.5 XML Code Generation

Following Relational database Table's data convert into XML file.

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130

3.6 Table and XML code

TransactionId	TransactionDate	TransactionType	TransactionMode	FromAccountNumber	ToAccountNumber	CheckNumber	Amount
1	5/28/2011 12:00:00 AM	Deposit	Cash		C0001	1000	100000
2	8/26/2011 12:00:00 AM	Deposit	Cash		C0006		100000
3	8/26/2011 12:00:00 AM	Deposit	Cash		C0003		50000
4	8/26/2011 12:00:00 AM	Withdrawal	Cash	C0006		150	50000
5	8/26/2011 12:00:00 AM	Withdrawal	Cash	C0006		160	50000
6	8/26/2011 12:00:00 AM	Deposit	Cash		C0005		100000
7	8/26/2011 12:00:00 AM	Withdrawal	Cash	C0003		450	100000
8	8/26/2011 12:00:00 AM	Withdrawal	Cash	C0006		250	50000
9	12/12/2011 12:00:00 AM	Deposit	Cash		C0003		11111

```xml
- <NewDataSet>
  - <Table1>
      <TransactionId>1</TransactionId>
      <TransactionDate>2011-05-28T00:00:00+05:30</TransactionDate>
      <TransactionType>Deposit</TransactionType>
      <TransactionMode>Cash</TransactionMode>
      <ToAccountNumber>C0001</ToAccountNumber>
      <CheckNumber>1000</CheckNumber>
      <Amount>100000</Amount>
    </Table1>
  - <Table1>
      <TransactionId>2</TransactionId>
      <TransactionDate>2011-08-26T00:00:00+05:30</TransactionDate>
      <TransactionType>Deposit</TransactionType>
      <TransactionMode>Cash</TransactionMode>
      <FromAccountNumber />
      <ToAccountNumber>C0006</ToAccountNumber>
      <CheckNumber />
      <Amount>100000</Amount>
    </Table1>
  - <Table1>
      <TransactionId>3</TransactionId>
      <TransactionDate>2011-08-26T00:00:00+05:30</TransactionDate>
      <TransactionType>Deposit</TransactionType>
      <TransactionMode>Cash</TransactionMode>
      <FromAccountNumber />
      <ToAccountNumber>C0003</ToAccountNumber>
      <CheckNumber />
      <Amount>50000</Amount>
    </Table1>
  - <Table1>
```

4. Conclusions

The design goals of XML emphasize, simplicity, generality and usability over the internet. It's textual data format with strong support via Unicode for the language of the world. This proposed approach converts the relational database like MS-Access and MS-SQL to XML flat file. In future this can be enhanced into multiple databases. In this method the semantic constraints present in the source databases are not included in the conversion. In future it can be included in the conversion process.

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