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Introduction

The explosion of internet and the progress of technologies give some new approaches on databases used in information systems. It has some consequences on the management of information which becomes more complicated. Firms are some good consumers of big and heterogeneous information. So in order to answer their needs, some new standards such as XML: extensible markup language are trying to make and to represent information.
1.) Context.

Today web applications become more and more sophisticated and need to access to a full different type of information. These applications are the diffusion of information such as publicity, the exchange of information such as news, the search of information which uses some search web engine and finally the web business such as purse activities or transactional commercial activities which develop and increase every day. Now a lot of firm open their system of information to the internet, and so some new kind of architecture appear. The development of internet and firms' technologies show that the web applications need to couple internet technologies and databases. Today clients access to the databases through the web and so it needs a special architecture in order to answer to their requests. In parallel, Web sites are developing every day. The web sites become very numerous and very heterogeneous. Their contents are very complex for example we can find several HTML files with different links and it has became very difficult to modify it when it is necessary that's why database is a good solution to solve this problem. It gives a method to represent information and organize a logical hierarchy between information.

2.) Databases.

2.1) Definition.

A database is a collection of files (entity) which are binding with logical links and organizing in order to answer efficiently to a big variety of questions.

2.2) The different models.

- The rules of integrity and coherence.
- The rules of security and confidentiality.

This model must represent the universe in table of two dimensions. The table is called relational table. All the model is creating on a schema for example on figure 3, it represents an object “CLASS” which is identified by its primary key “NumClass”, “ROOM” which is identified by its primary key “NumRoom” and “SUBJECT” which is identified by “NumSubject”. This key is unique and identifies each object CLASS”, “ROOM” and “SUBJECT”. The information will be obtained by asking some requests on this table by using a query language SQL: Structured Query Language.
Figure 3: Example of a relational schema

For example, the relational table CLASS is:

<table>
<thead>
<tr>
<th>NumClass</th>
<th>Nbstudent</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>100</td>
</tr>
</tbody>
</table>

The advantages of this model are that the query language is based on a solid theory algebra rules and it is simple to build. But the inconvenience of this model is that the schema is fixed and it is difficult to modify it.

So the second model is a model of files. It has a simple structure and so it is easier to modify than the first model. This model consists of collecting files and organizing them as the system of files of an operating system such as we have on a computer. In this model, the big advantage is the simplicity for managing files. But there are no information on the structure and no schema so the consequences are that information can be redundant. But the real problem is that there is no query language for this model.

The third model is the semi-structured data which must answer to the facts of that:

- The data cannot be compatible with a schema.
- The structure of the data evolves and needs to be updated frequently.
- The data can be structured slightly.

It is a compromise between the relational model and the model of files. So there is a supple schema and a query language. This model appeared in order to manage heterogeneous and structured data.
3.) **XML (Extensible Markup Language) and relational databases.**

3.1) **What is XML?**

XML was born of the SGML (standard generalized markup language) from the W3C consortium. W3C are a group of 400 firms, Oracle, IBM…, and laboratories research as INRIA (Europe), MIT (USA). W3C must define a model to facilitate the exchange of data on the internet. XML was created in order to uniform document structure. XML is independent of the internet browser and it gives the possibility to represent the same document in some different formats such as HTML or pdf, ps….

XML defines a standard model of data exchange. As HTML, XML has got some tags which represent the structure's definition. Figure 4 shows an extract of XML code.

```xml
<?xml version="1.0" encoding="ISO-8859-1" standalone="yes"?>
<!DOCTYPE Guide SYSTEM "travel.dtd"><Guide version="2.0">
    <Restaurant>
        <Name> Aubergeade </Name>
        <Street> Des paris </Street>
        <Phone> 0148152256 </Phone>
        <Manager> Dupuis </Manager>
    </Restaurant>
    <Restaurant>
        <Name> La Licorne </Name>
        <Street> Des Moines </Street>
        <Phone> 0148253278 </Phone>
        <Manager> Dupuis </Manager>
    </Restaurant>
    <Bar>
        <Name> Rose and Crown </Name>
    </Bar>
</Guide>
```

Figure 4: An extract of XML code which describes bars and restaurants.

The second line gives the access of the DTD (document type definition). The DTD defines the tags for example the tag `<Name>` and the schema of the document. These tags must be in the right order. First of all, the document must begin with a first tag and finish with an end tag. The tags frame the elements. The tags allow us to build some elements of the document. Each element is linking with a simple or complex attribute. They can be integrating in other elements. A document is simply a continuation of elements which are built into other elements.
3.2) Storage of XML documents in a relational database.

<table>
<thead>
<tr>
<th>root</th>
<th>origin</th>
<th>target</th>
<th>label</th>
<th>ltype</th>
<th>ntype</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>2</td>
<td>name</td>
<td>AGGR</td>
<td>STRING</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>3</td>
<td>manager</td>
<td>AGGR</td>
<td>INTEGER</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>4</td>
<td>address</td>
<td>AGGR</td>
<td>NODE</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
<td>5</td>
<td>number</td>
<td>AGGR</td>
<td>INTEGER</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
<td>6</td>
<td>street</td>
<td>AGGR</td>
<td>STRING</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>7</td>
<td>drive</td>
<td>ASSC</td>
<td>NODE</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>8</td>
<td>mark</td>
<td>AGGR</td>
<td>STRING</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>9</td>
<td>color</td>
<td>AGGR</td>
<td>STRING</td>
</tr>
</tbody>
</table>
3.3) **XML and query language.**

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3.4) **Publication of XML documents in a relational database.**
4) XML and federated databases.

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Bibliography:

Online resources

http://www.e-xmlmedia.fr/site_francais/documentation_livres_blancs.htm


cedric.cnam.fr/vertigo/Cours/Valeur-C/bamain-valc-4x.pdf


Dr Yanne Rikik. XML et les bases de donnees www.httr.ups-tlse.fr/pedagogie/cours/bd/bdrel.pdf

M.Boughanem. Bases de donnees relationnelle

Text resources

B.Defude. XML et Bases de donnees
Glossary:

- **DTD**: document type definition
- **HTML**: HyperText Markup Language
- **SGML**: Standard generalized markup language.
- **XML**: Extensible Markup Language
- **XML-QL**: Extensible Markup Language-Query Language
- **XQuery**: Extensible Query Language
- **XSLT**: Extensible Stylesheet Language transformation