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Standard Languages for Creating a Database to Display Financial Statements on a Web Application

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Abstract—XHTML and XBRL are the standard languages for creating a database for the purpose of displaying financial statements on web applications. Today, XBRL is one of the most popular languages for business reporting. A large number of countries in the world recognize the role of XBRL language for financial reporting and the benefits that the reporting format provides in the collection, analysis, preparation, publication and the exchange of data (information) which is the positive side of this language. Here we present all advantages and opportunities that a company may have by using the XBRL format for business reporting. Also, this paper presents XBRL and other languages that are used for creating the database, such XML, XHTML, etc. The role of the AJAX complex model and technology will be explained in detail, and during the exchange of financial data between the web client and web server. Here will be mentioned basic layers of the network for data exchange via the web.

Keywords—XHTML, XBRL, XML, JavaScript, AJAX technology, data exchange.

I. Introduction

TODAY it is common to use information and communication technology in the field of finance and financial reporting (even in public). The standard language for creating a database that can be applied for the purposes of displaying the financial statements on the Web is XHTML (Extensible HyperText Markup Language) [13]. XHTML is part of the family of XML (Extensible Markup Language) [17] markup languages and mirrors or extends versions of the widely used HTML (Hypertext Markup Language) [5], the language in which Web pages are formulated. XHTML is created by combining XML (Extensible Markup Language) and HTML. XML has a standardized markup language structure and content of the data, with the main usage to share them around the world, while HTML is only a description language for web development (what is generally well known). XML is used to describe data and documents and is available as an open standard which is evident from the World Wide Web Consortium (W3C, [8]). XML markup language structure and content of data with browser-player includes a set of techniques under the name AJAX (Asynchronous JavaScript and XML) [2]. The application of new information

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and communication technologies in finance, especially through the use of the Internet and XBRL (Extensible Business Reporting Language) [9] significantly influence the improvement and efficiency of financial reporting. XBRL is expandable and applicable language designed for business reporting.

The reasons why the paper proposes the use of the XBRL standard for financial reporting are: (a) users of financial statements can process information much faster, (b) data processing is much more effective, (c) XBRL format can allow processing of data in different languages and under different accounting standards, and (d) adapt them to the requirements of different users [1]. Production and use of data in XBRL format supports a significant number of producers accounting software, including SAP, Oracle and IBM as well as numerous specialized XBRL manufacturers. XBRL is an open standard for digital business reporting, which represents a standardized XML-based computer language mainly used for the transfer of business and financial data [16].

II. Creation of Document with Usage of XML

XML language is written in the tags <i> that are different from other markup languages which do not have pre-defined names that can be used, and where developers have to meet a certain set of rules for valid definition of XML. Only the developer has the freedom to define the tag. The data set can be considered as an XML document if it is structured in a way that requires XML specification.

All XML documents must have a root element that is the parent of the other elements on the lower level. The example shows the root, children and children's children of parents (in this case root):

```
<root>
  <child>
  <subchild>.....</subchild>
  </child>
</root>. [16]
```

As can be seen from the previous example, all the elements that are created must have end tags. XML tags are very sensitive to small and capital letters. Attribute values in the XML must be written within pointed brackets. XML can also be used for the exchange of electronic documents and digital signing of documents. Some services and protocols that are used on the web are mainly based on XML.

XML documents consist of character data and code. The basic components that are defined XML specification are: code element, the command, the declaration of the document

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(at bottom) entities and comment. Parts of an XML document are (XML code example at bottom of this paragraph [14]): Prologue, which describes the XML version and type of document, with the document type declaration and the actual content of the data.

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE note [
<!ENTITY nbsp " ">
<!ENTITY writer "Writer: MV.">
<!ENTITY copyright "Copyright: W3Schools.">
] >
<note>
<to>Association of Financial & IT professionals of
Međimurje</to>
<from>FINA</from>
<heading>Reminder</heading>
<body> Financial report </body>
<footer>&writer; &copyright;</footer>
</note>


<?xml version="1.0" encoding="ISO-8859-1"?>
 <message>
 <for>Association of Financial & IT professionals of
Međimurje</for>
 <from>FINA</from>
 <subject>Reminder</subject>
 <description>Financial reports.</description>
 </message>
```

XML document defines the data content, but does not say anything about the display of data. The element can contain text, other elements and attributes. Also, it should be noted that the element can be without content. The XML does not have strict rules when to use elements and attributes. Attributes cannot contain multiple values but elements can. Attributes cannot be hierarchical structures but elements can. Attributes are best for use only as metadata because they are complex for expanding. XML schemas are used to validate XML documents. Schemes describe in detail the structure of the XML document, which facilitates the checking of the validity of the XML documents [15].

There are two basic types of work with XML documents: (1) type of work based on the tree and (2) type of work based on events. Type of work based on the tree allows full parsing (DOM) and mapping the entire XML document into an object tree structure. In the type of work with XML documents, the sequential (linear) one-way parsing is present. Parse generates events that are processed in the application. XML markup language structure and the content of the data together with the browser, makes a set of technologies under the name AJAX (Asynchronous JavaScript and XML) [2].

III. The Application of AJAX Technologies for the Exchange, Management and Presentation of Financial Data

AJAX web application can return the data to the Web server asynchronously (in the background), without affecting the display and behavior of the website. AJAX technology

originally refers to the following technologies: (1) XHTML and CSS technology that is used for presentations, (2) Document Object Model (DOM) technology that is used to dynamically display and interact with data, (3) XML and XSLT technology that is used for the exchange, management and display of data, (4) the XMLHttpRequest object for asynchronous communication technology, (5) JavaScript scripting language to connect the mentioned technologies.

AJAX technology enabled access to Web applications at a rate that is present when accessing common desktop applications. This improvement in speed of access to web applications is achieved by placing the JavaScript technology and the XMLHttpRequest object between webs forms (module web applications) and web servers (Fig. 1).
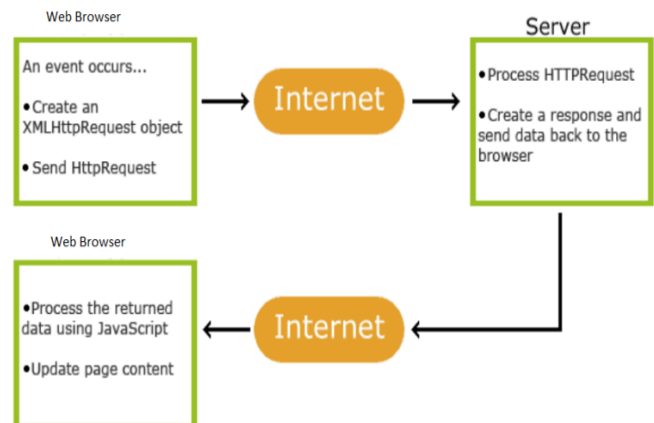

Fig. 1 Work of AJAX technology ([2], modified by authors)

Fig. 1 shows the work of AJAX technology. For example, a user with the client computer enters the data in the form of a web application. After the user finishes entering data into a form, the data are sent to JavaScript scripts and not directly to the server. Java script sends the data to the server for processing, and the user is not aware of any current data processing, as you can find your browser does not update immediately. The browser sends data asynchronously and the user does not have to wait for a response from the server to be able to continue to operate. The user can still fill out the form, or use the website, and that information is transmitted (and received) in the background, all of which allows for higher speed access to the web application.

Fig. 2 shows the work of web applications using AJAX technology. JavaScript functions can complete the form fields, add the contents of the page or to do something else, and all that is done immediately, resulting in increased speed (so, it is not necessary every time to transmit the entire page to the server and back), and also gives the user the impression of the instant answer like user is expecting when using usual desktop applications (Fig. 2). JavaScript functions can: receive data, carry out their processing, to send a new request to the server and to do all that without any need for user intervention. That is the main advantage of the XMLHttpRequest object. The result is a dynamic web pages and quick access to the application on the website with a high degree of interaction,

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like it is usual with the standard desktop applications, and with all the benefits of the Internet.
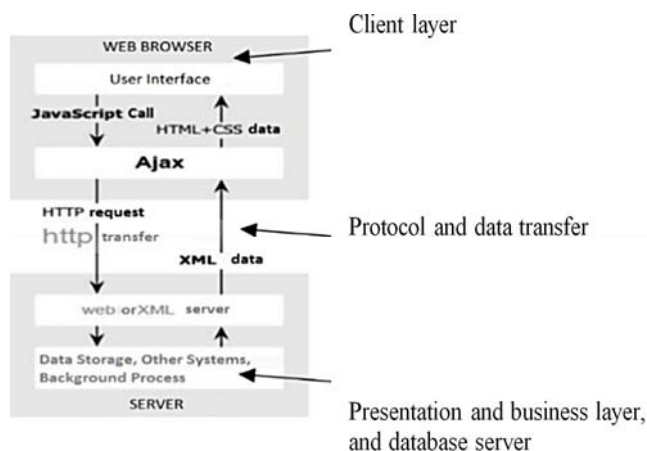

Fig. 2 Work of Web applications that are using AJAX technology
(Source: authors according to [2])

In the life cycle of AJAX applications, the server has a dual role (Fig. 2). The first role is the delivery of a good web browser. Until now it was thought that the initial delivery of content is mostly static, that is to write the application as a set of html, css and js files, which is able to deliver every web server. In this approach there is nothing that could be considered erroneous or false. One could speak of such an approach, although it is not the only way of programming using AJAX technology. The advantage of AJAX technology is that Web applications can request only the content that they need to see the state change, so that it drastically reduces the processing time (the second role) [4].

An example of AJAX technology (at bottom of this paragraph [3]) and integration of HTML, CSS, JavaScript, XML, XMLHttpRequest's:

```
<!DOCTYPE html>
<html>
<style>
table,th,td {
 border : 1px solid black;
 border-collapse: collapse;}
th,td {
 padding: 5px;}
</style>
<body>
<button type="button" onclick="loadDoc()">Get my CD collection</button>
<br><br>
<table id="demo"></table>
<script>
function loadDoc() {
var xhttp = new XMLHttpRequest();
 xhttp.onreadystatechange = function() {
 if (this.readyState == 4 && this.status == 200) {
 myFunction(this);}};
 xhttp.open("GET", "cd_catalog.xml", true);
 xhttp.send();}
function myFunction(xml) {
 var i;
```

```
 var xmlDoc = xml.responseXML;
 var table="<tr><th>Artist</th><th>Title</th></tr>";
 var x = xmlDoc.getElementsByTagName("CD");
 for (i = 0; i <x.length; i++) {
 table += "<tr><td>" +
 x[i].getElementsByTagName("ARTIST")[0].childNodes
[0].nodeValue +
 "</td><td>" +
 x[i].getElementsByTagName("TITLE")[0].childNodes
[0].nodeValue +
 "</td></tr>";}
 document.getElementById("demo").innerHTML = table;}
</script>
</body>
</html>
```

It is widely known that the OSI network model computer contains seven layers which are: physical layer, data, network, transport, the session, presentation and application layer, and Fig. 2 shows how AJAX applications moved some of the role of the presentation layer in the new layer, the client.
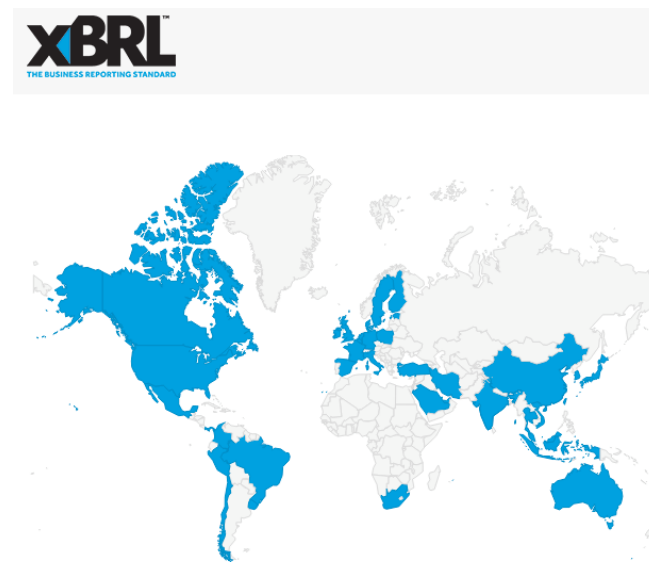
IV. USING XBRL STANDARD

Fig. 3 Countries in the world where it applies XBRL standard [7]

XBRL is an open international standard used worldwide in digital business reporting (Fig. 3). XBRL language is used in more than 50 countries (Fig. 3), where every year it creates more than 50 million XBRL documents, which replaced paper financial statements with useful, accurate and efficient digital versions [11]. The reason for using the XBRL standard is reflected in the numerous benefits it provides. For example, a significant number of producers accounting software, including SAP, Oracle and IBM, as well as numerous specialized XBRL manufacturers support the production and use of data in XBRL format [12].

By using XBRL, companies are able to consolidate the results of all sectors and branches with greater speed and reliability; improve the accuracy and reliability of financial data; reduce the cost of preparing the data in specific formats;

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focus attention on analyzing, forecasting and decision-making; to achieve faster and more efficient decision-making; improve relations with investors; streamline processes in reporting and reduce the cost of regulatory reporting to tax and other authorities; get a faster response from other parties (including banks and regulators); avoid protected systems and software that are difficult and expensive to change [1].

The advantage of XBRL format is that it improves the ability to search information (which is very important in a business report or create business reports), their comparison between organizations and between periods, and allows easier transfer of information between different systems [1]. This concept is based on the concept of taxonomy, the group definitions that together provide meaning to the concept of reporting. Taxonomies are used to define the conditions of accounting, financial and non-financial reporting. XBRL taxonomy is a dictionary that XBRL is used to define the specific tags for individual items of data. Example taxonomy is US-GAAP-INS taxonomy that describes tags that are used for business reporting of insurance companies [1], [6].

The importance of XBRL is emphasized by the fact that the 2016 XBRL officially identified as a specification that can be formally used in public procurement procedures in the European Union. The requirements for the specification referred to Annex 2, including coherence with the European standardization and market acceptance of which testifies to the use of XBRL by the European Central Bank, the European Supervisory Authorities for Banking, European Supervisory Body for Insurance and Professional Pension Insurance, the European Supervisory Authority for Securities and Capital Markets, together with national regulators of the 17 member states of the European Union. At the moment, only the Croatian National Bank has to submit reports in XBRL format to the European supervisory authority for banking [1], [10].

III. Conclusion

XBRL is the recognized global standard for financial reporting. XBRL provides a number of benefits for companies, accountants, investors, regulators, analysts and other users of financial reporting. Many countries in the world are introducing a legal obligation of financial reporting in XBRL format, for a number of advantages that the format offers. It is expected that more and more companies voluntarily publish financial statements in XBRL format (so it will not be necessary to introduce legislation in the various countries of the world that all the companies must use the following format for business reporting). The benefits of XML schemas are secured control of the commands because the XML schema document is created according to the same rules that apply to XML documents. Within the XML schema document, much more precise control of the content of the document can be carried out and a number of different properties can be examined. The disadvantage is that the syntax that needs to be overcome in order to create documents is too complex. Today, companies are still frequently publishing their business reports in PDF format and/or text format and/or tabular form and/or in an HTML document. The

primary reason why for this work investigating AJAX technology is that AJAX technology allows access to web applications at a rate that is present when accessing common desktop applications (which is certainly a significant novelty).

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