Teaching Tip

Consuming Web Services: A Yahoo! Newsfeed Reader

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ABSTRACT

Service Oriented Architecture (SOA) shows demonstrable signs of simplifying software integration. It provides the necessary framework for building applications that can be integrated and can reduce the cost of integration significantly. Organizations are beginning to architect new integration solutions following the SOA approach. As such, information systems (IS) curricula must introduce students to SOA and Web Services as early as possible. This paper presents an ideal opportunity to expose IS students to SOA as soon as they are introduced to the basics of HTML and programming. The application developed by students, a Yahoo! newsfeed reader, running as a client-side application, has the additional benefit of only requiring the Internet Explorer. A JavaScript translation and an implementation of the application in classic Active Server Pages (ASP) for server-side execution are also presented.

Keywords: Service Oriented Architecture, SOA, Web Services, RSS, Newsfeed, VBScript, JavaScript, ASP

1. INTRODUCTION

A fundamental tenet for information architecture is to maintain data consistency. In its simplest connotation, data consistency is about having one version of reality. It is not a fad to want inventory counts or customer information to be a reflection of reality no matter which application accesses (or updates) them. Therefore, enterprise wide data integration (and data consistency) will remain a foundation for building an organization's information architecture.

Unfortunately, enterprise data integration remains a challenge for a variety of reasons. First, for most organizations, an unplanned approach to acquiring information systems has led to unintegrated legacy applications and multiple databases with duplicated data and associated inconsistencies. Second, you cannot integrate overnight. Therefore, interim solutions such as data warehousing must be employed to overcome lack of access to integrated data. Third, there is no total solution. Even ERP systems that can, indeed, replace a majority of legacy applications and bring about not only enterprise data integration, but also process integration, must co-exist with other applications today and in the future. Fourth, even if you start with an integrated system, data integration will not be automatic as you acquire new applications.

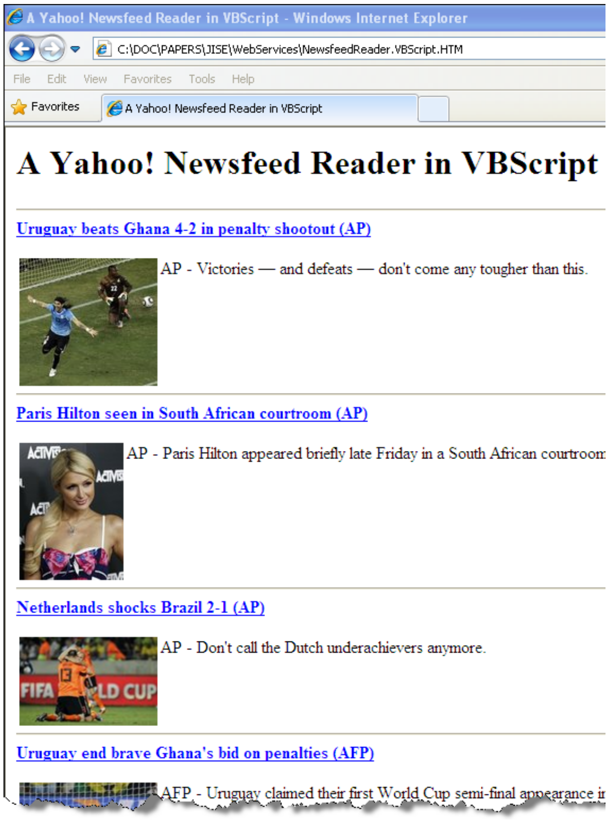
It has become evident that the ideal of enterprise data integration can only be realized if there is an infrastructure for Enterprise Application Integration (EAI). As such, a variety of middleware software have been developed to provide the necessary bridging of applications that is required in order to maintain the goal of one of version of reality no matter which application accesses or updates data.

A fundamental requirement for EAI is that each application can deliver the needed data to a requesting application from (its) database. And, with the recognition that the requesting application (the consumer) and the providing application (the producer) may not share the same memory space and in fact be separated by the Internet, XML has come to represent the de facto standard format for transfer of needed data. Software systems that are designed to support such transfer of data to requesting applications have come to be known as Web Services.

Service Oriented Architecture (SOA) is, in part, a software design principle advocating engineering an application as a suite of Web Services (Newcomer and Lomow, 2004). It provides the necessary framework for building applications that can be integrated and can reduce the cost of EAI significantly. Organizations are cataloging Web Services of their exiting application portfolio and are beginning to "mashup" applications in a fraction of the time that it used to take to create a new business application from scratch, while maintaining the data integration ideal. As such, information systems (IS) graduates must enter the job market with a firm understanding of Web Services and SOA. This paper presents an ideal opportunity to expose IS students to Web Services as soon as they are introduced to the basics of HTML and programming. The Really Simple Syndication (RSS) newsfeed is used as the vehicle to teach students how to develop a client-side application to consume a Web Service. The next section describes in detail the pedagogical application in VBScript which is supported by Microsoft's Internet Explorer. Appendix A gives a JavaScript implementation while Appendix B presents the application in classic Active Server Pages (ASP) for server-side execution.

2. BUILDING A NEWSFEED READER IN VBSCRIPT

The Really Simple Syndication (RSS) is a format for publishing frequently updated content such as news headlines. An RSS document, which is called a newsfeed, is standardized XML data which can be retrieved from a newsfeed provider and processed by software. In this section, we develop a newsfeed reader in VBScript. Yahoo!'s sports newsfeed is used as the sample source in Figure 1 which depicts the application as viewed in Internet Explorer.


A Yahoo! Newsfeed Reader in VBScript - Windows Internet Explorer
C:\DOC\PAPERS\JISE\WebServices\NewsfeedReader.VBScript.HTM
File
Edit
View
Favorites
Tools
Help
Favorites
A Yahoo! Newsfeed Reader in VBScript

A Yahoo! Newsfeed Reader in VBScript

Uruguay beats Ghana 4-2 in penalty shootout (AP)

AP - Victories — and defeats — don't come any tougher than this.

Paris Hilton seen in South African courtroom (AP)

AP - Paris Hilton appeared briefly late Friday in a South African courtroom

Netherlands shocks Brazil 2-1 (AP)

AP - Don't call the Dutch underachievers anymore.

Uruguay end brave Ghana's bid on penalties (AFP)

AFP - Uruguay claimed their first World Cup semi-final appearance in

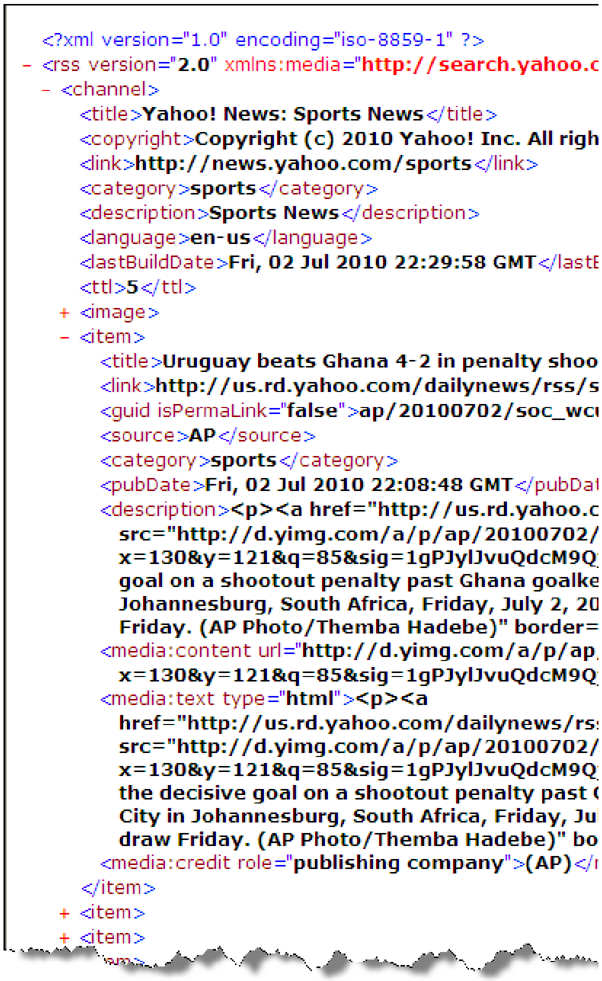
Figure 1. The Yahoo! Sports Newsfeed Reader

Figure 2 shows the actual XML data received from the newsfeed provider. An RSS Version 2.0 document is composed as an XML tree with the root element/node of <rss>. Subordinate to the <rss> element is a single <channel> element which contains information about (metadata) the news channel and its contents. A channel may contain any number of <item>s, each of which represents a news item (or story). The <item> node will have a number of children. The child node <title> gives the title of the news item (e.g., Uruguay beats Ghana 4-2 in penalty shootout (AP)). The child node <link> points to the full news story (e.g., http://us.rd.yahoo.com/dailynews/rss/sports/...). And, the child node <description> provides the item synopsis (e.g., <p><a href ... AP - Victories &mdash; and defeats … </p>…).

Building the newsfeed reader consists of the following two steps:

1. Request the newsfeed from Yahoo! sports newsfeed provider (Web Service)
2. Process the XML Tree received by assigning all <item> nodes to a collection
   a. For each item in the collection, extract the value of the <title>, the <link>, and the <description> nodes
   b. Write the extracted values to the output document in the following HTML format

```
<a href=extracted_link_value>
extracted_title_value </a><br />
extracted_description_value
<hr />
```



```
  <?xml version="1.0" encoding="iso-8859-1" ?>
- <rss version="2.0" xmlns:media="http://search.yahoo.c
  - <channel>
      <title>Yahoo! News: Sports News</title>
      <copyright>Copyright (c) 2010 Yahoo! Inc. All righ
      <link>http://news.yahoo.com/sports</link>
      <category>sports</category>
      <description>Sports News</description>
      <language>en-us</language>
      <lastBuildDate>Fri, 02 Jul 2010 22:29:58 GMT</lastE
      <ttl>5</ttl>
    + <image>
    - <item>
        <title>Uruguay beats Ghana 4-2 in penalty shoo
        <link>http://us.rd.yahoo.com/dailynews/rss/s
        <guid isPermaLink="false">ap/20100702/soc_wc
        <source>AP</source>
        <category>sports</category>
        <pubDate>Fri, 02 Jul 2010 22:08:48 GMT</pubDat
        <description><p><a href="http://us.rd.yahoo.c
          src="http://d.yimg.com/a/p/ap/20100702/
          x=130&y=121&q=85&sig=1gPJylJvuQdcM9Q
          goal on a shootout penalty past Ghana goalke
          Johannesburg, South Africa, Friday, July 2, 20
          Friday. (AP Photo/Themba Hadebe)" border=
        <media:content url="http://d.yimg.com/a/p/ap
          x=130&y=121&q=85&sig=1gPJylJvuQdcM9Q
        <media:text type="html"><p><a
          href="http://us.rd.yahoo.com/dailynews/rs
          src="http://d.yimg.com/a/p/ap/20100702/
          x=130&y=121&q=85&sig=1gPJylJvuQdcM9Q
          the decisive goal on a shootout penalty past (
          City in Johannesburg, South Africa, Friday, Ju
          draw Friday. (AP Photo/Themba Hadebe)" bo
        <media:credit role="publishing company">(AP)</
      </item>
    + <item>
    + <item>
```

Figure 2. The Actual XML Data Received from Yahoo! Sports Newsfeed

In VBScript, the preceding two steps are implemented as follows:

```
<html>
<head>
```

```
<title>A Yahoo! Newsfeed Reader in VBScript</title>

<SCRIPT Language="VBScript">
Function Main()

'Step 1: Request the newsfeed from Yahoo! sports newsfeed
' (Web Service)
'The xmlDoc object will be assigned the
'XML document received from the Web Service ...

Dim xmlDoc
Set xmlDoc = CreateObject("Microsoft.XMLDOM")
xmlDoc.async = "false"

xmlDoc.setProperty "ServerHTTPRequest", True

'A different URL can be used below
'for a different RSS newsfeed ...

xmlDoc.Load("http://rss.news.yahoo.com/rss/sports")

'Step 2: Process the XML Tree received by
'assigning all <item> nodes to a collection ...

Set NodeList = xmlDoc.getElementsByTagName("item")

for each Node in NodeList

'Step 2a: Extract the values of the child nodes <title>,
 '<link>, and description

zTitle = Node.getElementsByTagName("title").item(0).text
zLink = Node.getElementsByTagName("link").item(0).text
zDescription =
  Node.getElementsByTagName("description").item(0).text

'Step 2b: Output the HTML encoded output ...

document.write "<a href='" & zLink & "'><b>" & zTitle &
  "</b></a><br/>"
document.write zDescription
document.write "<hr/>" & vbCrLf

next

End Function
</SCRIPT>
</head>

<body>
<h1>A Yahoo! Newsfeed Reader in VBScript</h1>
<hr/>
<SCRIPT language="VBScript">
        Main()
</SCRIPT>
</body>
</html>
```

To retrieve any other newsfeed, simply change the URL to the desired newsfeed Web Service. The URL, http://news.yahoo.com/rss, gives the address for each newsfeed provided by Yahoo!. In Appendix A we present a JavaScript implementation of the newsfeed reader, while Appendix B offers an ASP version of the application for server-side execution.

3. CONCLUDING REMARKS

As foreseen by Microsoft's Bill Gates (2005), "the broad and rich foundation of the Internet will unleash a 'services wave' of applications and experiences available instantly over the Internet to millions of users." Next generation Rich Internet Applications (RIAs) have quickly become the standard in web application development and interface design. As such, core skill sets for modern application development must now include AJAX, XML, and Web Services in addition to the basic web development skills that have been taught for many years. At the same time, the impetus for modernizing legacy systems and enterprise application integration, and the emergence of Service Oriented Architecture (SOA) as a powerful and flexible solution for systems integration, has made it necessary to bridge the education gap and ensure that IS students acquire the needed skills for supporting and enabling modern enterprise systems.

To that end, the IS 2010 Curriculum Guidelines for Undergraduate Degree Programs in Information Systems (ACM/AIS, 2010) recognizes as a motivating factor for IS curriculum revision: the "emergence of a new architectural paradigm – Service-oriented architecture, Web services, software-as-a-service, and cloud computing are all important elements in the new way of organizing the fundamental architecture for computer-based systems and solutions that is gradually becoming the dominant paradigm of organizational computing." Nevertheless, as pointed out by Petcu1 and Iordan (2009), fitting SOA education into a crowded curriculum can be a challenge. Indeed, SOA has a place in each of the seven core courses of the recommended curriculum. Therefore, Web Services technologies can and should be introduced early in the IS curricula (Lim, Hosack, and Vogt, 2010).

This paper has presented an ideal opportunity to expose IS students to Web Services as soon as they are introduced to the basics of HTML and programming. SOA is all about "connections," and Web Service is just the connection technology to service oriented architecture. The pedagogical application developed by students, a Yahoo! newsfeed reader, will readily open the door to exploring other Web Services including those from Amazon, Google, Netflix, and Yahoo! for projects in each of the core courses of the IS curriculum.

4. REFERENCES

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AUTHOR BIOGRAPHY

Mohammad Dadashzadeh is a Professor of MIS at Oakland University. He has been affiliated with University of Detroit (1984-1989), Wichita State University (1989-2003) where he served as the W. Frank Barton Endowed Chair in MIS, and the Applied Technology in Business (ATiB) Program (2003-2009) at Oakland University where he directed more than two million dollars of funded projects at sponsoring organizations. Dr. Dadashzadeh has authored 4 books and more than 50 articles on information systems and has served as the editor-in-chief of *Journal of Database Management*. He has extensive consulting experience and more than 6,000 people have attended his professional training seminars worldwide. Dr. Dadashzadeh is a co-author of Iranian Standard Code for Information Interchange (ISCII) and a co-founder of Sinasoft.

APPENDIX A
The Newsfeed Reader in JavaScript

```
<html>
<head>
<title>A Yahoo! Newsfeed Reader in JavaScript</title>

<SCRIPT Language="JavaScript">
function Main()
{
//The xmlDoc object will be assigned the
//XML document received from the Web Service ...

var xmlDoc;
xmlDoc = new ActiveXObject("Microsoft.XMLDOM");
xmlDoc.async = "false";

xmlDoc.setProperty("ServerHTTPRequest", true);

//A different URL can be used below for a different RSS newsfeed ...

xmlDoc.load("http://rss.news.yahoo.com/rss/sports");

//Create a collection of all <item> nodes ...

NodeList = xmlDoc.getElementsByTagName("item");

for (i=0; i <= NodeList.length - 1; i++)
  {
        Node = NodeList[i];

        //Extract the values of child nodes <title>, <link>, and <description>
        zTitle = Node.getElementsByTagName("title").item(0).text;
        zLink = Node.getElementsByTagName("link").item(0).text;
        zDescription = Node.getElementsByTagName("description").item(0).text;

        //Output the HTML encoded output ...

        document.write ("<a href='" + zLink + "'><b>" + zTitle + "</b></a><br/>");
        document.write (zDescription);
        document.write ("<hr/>" + "\n");
  }
}
</SCRIPT>
</head>
<body>

<h1>A Yahoo! Newsfeed Reader in JavaScript</h1>
<hr/>

<SCRIPT language="JavaScript">
        Main()
</SCRIPT>

</body>
</html>
```

APPENDIX B
The Newsfeed Reader in Active Server Pages (ASP)

```
 <%@ Language="VBScript" %>
<html>
<head>
<title>A Yahoo! Newsfeed Reader in Classic ASP</title>
<%
Function Main()

'The xmlDoc object will be assigned the
'XML document received from the Web Service ...

Dim xmlDoc
Set xmlDoc = Server.CreateObject("MSXML2.DOMDocument")
xmlDoc.async = "false"

xmlDoc.setProperty "ServerHTTPRequest", True

'A different URL can be used below for a different RSS newsfeed ...

xmlDoc.Load("http://rss.news.yahoo.com/rss/sports")

'Create a collection of all <item> nodes ...

Set NodeList = xmlDoc.getElementsByTagName("item")

for each Node in NodeList

        'Extract the values of the child nodes <title>, <link>, and <description>

        zTitle = Node.getElementsByTagName("title").item(0).text
        zLink = Node.getElementsByTagName("link").item(0).text
        zDescription = Node.getElementsByTagName("description").item(0).text

        'Output the HTML encoded output ...

        response.write "<a href='" & zLink & "'><b>" & zTitle & "</b></a><br/>"
        response.write zDescription
        response.write "<hr/>" & vbCrLf

next

End Function
%>
</head>
<body>
<h1>A Yahoo! Newsfeed Reader in ASP</h1>
<hr/>
<%
        Main()
%>
</body>
</html>
```

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