

# Use of XML to Persist and Transfer Offline Data For Personalized Profiles

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## ABSTRACT

As the internet proliferates a web of interlinked data wider across the globe and deeper into the remotest areas, many more users across the globe are getting access to the web.

With the advent of Web 2.0 the pattern of internet usage has undergone a paradigm shift. Every user enjoys a virtual presence by creating personalized profiles at different portals like social network websites Facebook, LinkedIn etc & as in our case faculty/employees profiles at College/Organization. These profiles act as a repository of information of the user and help the employers/students to choose their prospective employees/institutions. Thus these profiles need to be regularly updated over the internet. At times, when a user wants to update his/her profile, there is a chance that net could be disconnected or very slow for images and publications etc. to upload, or there could be a chance that the user wants to have a full preview of his updates and uploads, before he actually wastes his bandwidth and hours on it.

Keeping in mind these points of views we started to develop a desktop application that would aid the faculty at Delhi College of Engineering in updating their profiles at official website with ease.

Through this paper we present user profile manager in the form of a desktop application.

The tool is specifically engineered to facilitate the faculty members to regularly update their profiles and other auxiliary information on the college website remotely via their desktop. This tool is predominantly developed in C# programming language and relies on Microsoft

.NET Framework 2.0. The application highlights the interaction of C# with a remote database server and ability of XML to persist data at client side and transfer the same also. We present a detailed look into the architecture of our application and then implement a prototype of the same.

**Keywords:** Profile manager, C#-Database interaction, offline profile preview, offline update

## 1. INTRODUCTION

Nowadays the World Wide Web (WWW) tends to become the major medium by which users access information and services[3]. The format of the information can be present in different ways and is dynamically changed primarily being governed by user preferences. The onset of Web 2.0 gave the freedom to a user to personalize the web. Web personalization can be defined as any action that tailors the Web experience to a particular user, or set of users[4].

This may be carried out in a number of ways and creating personalized profiles is one of the many ways to create net presence. These profiles not only help the users to interact with each other but at times are a source of valuable information. This service requires user to regularly update their profiles over the net so that proper information about them is passed on. A similar concept of profile creation and maintenance has been in use since few years in the academic field. Many colleges create the profiles of its faculty members over the internet.

This information about a professor serves to be of use to various companies and students and thus needs to be updated on a regular basis.

Managing and updating a profile on Web 2.0 platform is relatively easy but poses concern when the same profile needs to be updated regularly and traffic considerations are a serious concern. It requires the user to know the web technologies with which the site was developed like PHP, HTML et al, unless provided with a user-friendly user interface. Thus it amputates a user's efficiency.

Thus we developed a desktop application, which facilitates a user to update his/her profile remotely. This application provides a user (in this case a faculty member) an interface which contains the same profile as on the website. It stores the updates and data of a particular user on his/her system locally and whenever the internet connection is available for the next time all the information which includes the updates are transferred in a XML file to the server where the website is uploaded. The corresponding updated fields are then reflected on the website.

Also, the tool provides the faculty with various functionalities like updating their resumes, publications, editing images and adding lecture notes.

The rest of the paper is divided as follows in the next section we define the problem statement along with an analysis of proposed solutions. In section III we will elucidate the methodologies of development procedure and the various technologies that were applied during the development procedure. Followed by the last section, IV, which gives the future scope of the project and conclusion.

## 2. PROBLEM STATEMENT

The official website of Delhi College of Engineering (<http://dce.ac.in>) consists of a number of sections that focus on various aspects of college like academic programs being offered, departments, activities, et al. The site also has a section which contains

details of faculty & staff. Every faculty member has his/her own profile on the web site. The profile page of any contains key information about his/her profile like Name and designation, Image, Email, Lecture notes, Publications, Books Published, Research Publications in Conferences and in International Journals etc.

All this data needs to be updated often which proves utilitarian for the students scouting out for thorough guidance in some specialized discipline.

To do so, the faculty sends the information to be updated to the department which forwards it to the concerned web management team and all this procedure takes time.

Since long there has been a requirement for such an application that can help the faculty to do the described at their own with no inconvenience and an immediate effect.

### 2.1 ANALYSIS OF PROPOSED SOLUTIONS

The initial solution comprised of creating a FTP account for every faculty with his/her rights restricted to his/her folder on the website. This solution stated that whenever a faculty needs to overhaul his/her profile, he/she needs to download the corresponding "PHP" page using FTP and then try to understand the code in order to edit.

*Unreasonable for any faculty member, who is unaware of the web technologies used to first learn those technologies in order to update his/her profile. Also allowing access to FTP of the college website can prove to be a major security threat & opens a door to a number of vulnerabilities.*

Another solution could be to develop a web application which would allow access to a form like page post user log in. There he/she can update his/her respective profile in a simple and *easy manner as is in the case of social*

*networking website or updating an email account profile.*

But this solution necessitates a user to be connected to the internet which is not always the case. *Thus we tried to develop a desktop Application which will reside on user's computers and help them update their profiles on <http://dce.ac.in>.*

*The application works both in online as well as offline modes.* If an internet connection is not available then the user can create/update his profile which gets saved as an XML file on the user's system. He/She can then even have a preview of how these updates will be reflected on the website. Once the internet connection is available, the C# functions parse the XML file to get the desired information which is then passed to the server to update the respective PHP pages.

The various services provided are enlisted below and a detailed explanation on each is given in the Section IV.

- Faculty members can create a new profile online as well as offline.
- Update the profile online as well as offline.
- Edit the image for his/her' own page at the website.
- Manage his/her' own publications at the website.
- Upload their lecture notes on respective profile page for the perusal of others.
- Send email via "[FacultyMemberName@dce.ac.in](mailto:<FacultyMemberName>@dce.ac.in)" account.

### **3. TECHNICAL ASPECTS & APPLICATION DEVELOPMENT**

#### **3.1 TECHNICAL ASPECTS**

Our work has the following steps – which taken together constitute the technical contributions of this paper.

From the vast pool of programming languages C# was chosen for application development as

it surpasses other programming languages in terms of enhanced features, like faster and user-friendly UI development, more efficient than other standard languages like java and runs faster than those too. C# supports the introduction of XML comments. Far from being just another way to add comments to code, XML comments can actually turn into your documentation. The comments are placed into XML format and can then be used as needed to document your code. This documentation can include example code, parameters, and references to other topics. It finally makes sense for a developer to document his or her code, because those comments can actually become documentation independent of the source code.[12]

#### **3.1.1 STORING DATA ON LOCAL HOST**

The first and foremost problem faced was storage of profile data on client's computer. Installing any database server for the same didn't seem to be a good choice because it requires fair amount of memory and continual querying of database for data display and updating. Moreover, there was no standard means of transportation of database data to a web server running at remote host. Serialization of data can be looked upon as a tentative solution but considering the fact that the language which will serialize it at client's end is C# and the web scripting language used in PHP, the suggested solution fails to make an impact.

After database server, the next obvious choice was use of eXtensible Markup Language (XML). Today XML has become the unquestionable standard for generically data to be shared. XML provides a great way to take a snapshot of the object and store the contents into persist-able form – a file or a database typically. Also, C# provides wide support for the use of XML in an open, standards-compliant manner.

These extensive features of XML have been utilized in our application to provide support for management & use of data on remote servers when online, and store & use data while offline. The profile information is stored on the remote server in the form of multiple tables and on user's machine, in XML format. XML tags are defined in accordance with the information to be displayed. Use of XML made it possible to combine multiple tables into a single document.

In our application, a XML file is created locally when user logs in for the first time. It has user authentication information (encrypted) besides profile details. Once all the details are fetched, user can view them over application's User-Interface. To present this xml data in the format as on the web, our application harnesses the power of eXtensible Stylesheet Language Transformations (XSLT). It has become the language of choice for a very wide range of XML applications. XSLT is a style sheet language for XML documents. It can be used to process multiple XML documents and to produce any combination of text, HTML and XML output; XML is transformed on the fly without the user even noticing. XSLT uses a template-driven approach to transformations: you write a template that shows what happens to any given input element. [11]. With XSLT we have added as well as removed elements and attributes to or from the output file. We have also rearranged and sorted elements, performed tests and made decisions about which elements to hide and display, etc. In the transformation process, we created an XSL Style Sheet with a transformation template and added the XSL style sheet reference to the XML document. Since the components provided by C# are XSLT compliant so it nicely transformed our XML into XHTML. It helped us add, delete or edit the information using the same interface; the changes done are saved into the XML along with a flag value indicating the type of action, insertion/deletion/update/no effect. When user wants to persist the changes, dataset is created to point to the view in database; it is updated

using the XML stored locally. After updating the dataset, the changes are persisted into the database. All database activities are done atomically in separate transaction to ensure consistency of the database.

### 3.2 APPLICATION DEVELOPMENT

When user runs the application for the first time he is asked to authenticate himself on the remote server. If the user successfully logs-in, then his profile data is fetched from database and stored on his computer in XML files. And the user is directed to ProfEdit's main window as shown in figure 3. The window has following six tabs:



Fig. 3 Application's Main Window.

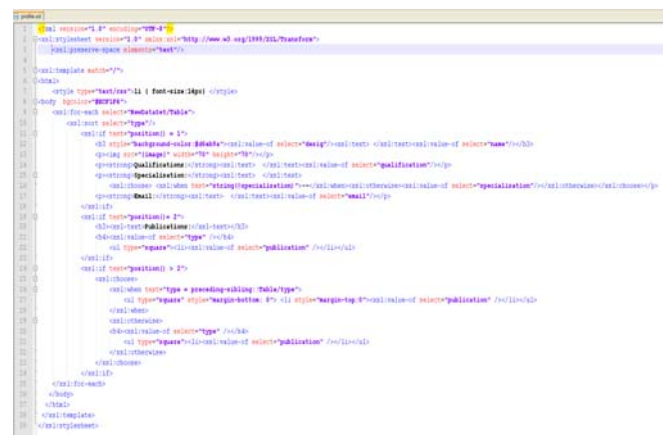


Fig 4 XSLT of the application under consideration



```
<?xml version="1.0" encoding="utf-8" ?>
<!-- Required user details -->
<userDetails>
  <!-- User ID -->
  <id>123</id>
  <!-- User Name -->
  <name>A. K. Singh</name>
  <!-- User Email -->
  <email>akg@iitd.ac.in</email>
  <!-- User Address -->
  <address>IITD, New Delhi, India</address>
  <!-- User Contact -->
  <contact>+91 11 2659 5121</contact>
  <!-- User Profile -->
  <profile>
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        <author>Singh, A. K., Singh, S. and Dandath, S. K.</author>
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        <author>Singh, A. K., Singh, S. and Dandath, S. K.</author>
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      <publication>
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        <author>Singh, A. K., Singh, S. and Dandath, S. K.</author>
        <year>2008</year>
        <url></url>
      </publication>
    </publications>
  </profile>

```

**Fig 5 XML of the application under consideration**

**1) Profile Preview:** This tab shows the profile in the same format as on the college’s website. The data displayed is fetched from XML files and is formatted in the desired format using XSLT.

**2) Basic Update:** This tab shows the minimum but mandatory fields for the existence of profile on the website. User can fill the fields provided against the desired titles and can update locally to preview the changes or can directly update on server. For updating on server, user needs to authenticate himself. An undo option is provided to undo the changes done during the session.

Session starts when user authenticates himself for the first time and ends when user exits the application i.e. once the user has logged in from any of the tab, further updating in the same tab and the others, can be done by simply clicking on the button. This is because every tab has similar updating options. This session state can be maintained by creating a file similar to cookie file on client’s machine.

**3) Maintaining Publications:** This tab helps user to add new publication(s), delete or edit the existing ones and undo the changes. Updating can be done locally or directly on server as user wishes.

**4) Editing Image:** This tab provides image browsing and editing (image cropping etc) options. Almost all image formats are allowed

to be browsed. After editing, the image is uploaded directly to FTP server.

**5) Managing Lecture Notes:** This tab helps faculty to manage lecture notes. All file formats are supported. The options provided are adding new one(s) and deleting the existing ones. There is no limit on the number of notes.

**6) DCEmail:** This interface makes user to log on to the SMTP server by providing his username & password for their respective accounts at <http://mail.dce.ac.in/>. After authentication, the user can generate the mail message using the form provided having the interface similar to that provided by the mail server.

## 4. FUTURE SCOPE AND CONCLUSION

### 4.1 FUTURE SCOPE

The generation, encryption and transfer of data over the network can be optimized by the use of multithreading paradigm. Different threads can be created which are monitoring each of these tasks individually.

We can accommodate for live update feature as and when a user updates the profile in desktop application, rather than just clicking a “submit” button after he has finished. We can use AJAX for this live synchronization with the web-servers provided the user is online.

The encryption and decryption algorithms can be modified and made more secure against vulnerabilities. The application currently doesn’t have any formal security mechanisms except for those offered by the basic authentication.

### 4.2 CONCLUSION

XML has always been considered the best means for inter-language communication, but harnessing its efficacy to persist data can open an arena for plethora of applications. Applications can also talk to each other with the use of XML, regardless of the fact that one application is web-based and other is desktop

based. Thus XML opens doors for communication across languages and applications which are not just on different machines but different Operating Systems also.

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