

# Inquiring Training and Employment Offers on the Web Using Web Services

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*Abstract:* - The fact is that throughout Europe, the civil servants have similar needs when it comes to accessing information on training and employment opportunities in order to deliver the best possible service to the public, especially sensitive groups such as unemployed individuals and/or members of underprivileged groups (immigrants, young and elderly, individuals lacking professional qualifications, one-parent families, etc). This work describes an integrated system based on Web Services that collects and offers up-to-date information on training and job offers from different web sources matched to the needs of each case. The system will help civil servants to connect the public needs to employment requests and training opportunities combining different web resources on an individual basis, minimizing at the same time communication expenses, data replication and expiration.

*Key-Words:* - Training, Job Matching, Web Services, Metadata.

## 1 Introduction

The current practice is that the civil servants gathers all the required information for the interested individual (education, family status, previous work experience, etc), identifies his/her weaknesses and strengths, sets priorities and goals (encouragement, training, finding a job, etc) and schedules a personal action plan accompanied by several personal or team meetings to empower and support him/her to achieve these goals.

During this support period the civil servant performs quite a frustrating search trying to identify the best possible training programs and/or job offers suitable for the individual. To find this information the civil servant either searches repeatedly on web sites of offering organizations, in newspapers and other means of communication, or is in frequent contact with the offering organization in a win-win tactic.

The proposed system introduces a solution based on Web Services that collects and offers up-to-date information on training and job offers from different web sources matched to the needs of each individual. Its goal is to help civil servants to match individual needs to employment requests and training opportunities. It combines different web resources on an individual basis minimizing at the same time communication expenses, data replication and expiration.

Furthermore, the proposed solution can provide the organizations and public bodies interested, with the means to disseminate their training programs and communicate job offers faster and more effectively, by targeting a large pool of specific individuals. The training programs are formed in a general way having in mind specific target groups while job offers include some parameters that can be matched better to some groups more than others. The proposed work can report on demand valuable statistics on unemployment in different underprivileged groups, demographic data, lack of necessary skills and other useful statistical figures in order to help in the scheduling of new policies. The proposed solution will give them the channels to disseminate these policies to the adequate civil servants in order to reach the beneficiaries that are made for.

The paper is structured in the following sections: *Section 2* presents a theoretical overview of the related literature and the technology of the proposed service while in *Section 3* the proposed solution is presented. *Section 4* is devoted to conclusion and discussion.

## 2 Materials and Methods

Nowadays, there are several applications that have been developed in the framework of national, EU

funded programs or through private initiative, to support the work of civil servants. The limitation of all these applications is that they are tailor-built to the needs of each agency and that the civil servants have to undergo the time consuming and painstaking procedure of submitting applications to all of them until they can find a job offer suitable to the needs of a particular individual. The proposed solution will not replace the aforementioned applications but it will interconnect them in a wider knowledge network offering added value services to all involved.

## 2.1 Methodology

The innovation of the proposed solution is its distributed nature based on the technology of Web Services [1] that offer a fast, reliable and effective communication between involved parties, providing up-to-date information customized each time to the needs of specific individuals and thus minimizing communication expenses, data replication and expiration.

Civil servants have to deal with unemployed people from underprivileged citizen groups who face several problems (lack of skills, disabilities, language problems, family problems, etc). Their efforts focus on first of all identifying their problems and then helping them to overcome them. Apart from empowering and supporting individuals to overcome their personal problems, they are at the same time trying to find for them suitable training programs and jobs.

To be effective, they have to make frequent contacts with training institutions and employment agencies, or directly with employers in order to locate job vacancies and training programs. The problem they face is that they have access to a limited number of resources as many as they can afford to contact or find. This is the reason why their work is focussed more on the empowering part and less in the actually finding of a job for these individuals. It is easier for them to recommend training in one of the training organizations that cooperate with their agencies, and to prepare them for a potential job interview, helping them at the same time to identify what is the work they want to do. Training, however is not directly connected to employment, and most of the courses offered are on basic skills, like communication skills, Business English, Information Technology, Marketing, etc.

The proposed work can solve all those problems that civil servants are facing today, namely:

- Identifying the most reliable and up to date sources of information.
- Searching several different on line databases using different login screens and search parameters.
- Storing this data in a system or file of their own in order to have convenient access to it.
- Not being able to exchange information electronically, or by any other means with the interested individuals.
- Identifying and removing information no longer valid (finished training courses, fulfilled job vacancies).
- The offering parties cannot estimate demand.

The solution is a single sign-on access service to a distributed collection of heterogeneous web resources. Though its Web Services infrastructure, the proposed solution can offer the secure exchange of this information.

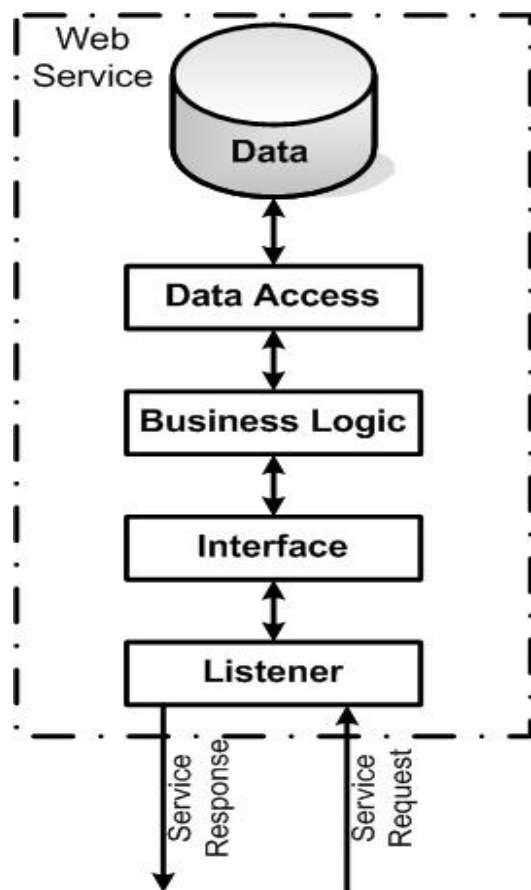


Fig. 1: Description of a Web Service

The term Web Service describes an important emerging distributed computing paradigm that differs from other approaches such as DCE, CORBA, and Java RMI in its focus on simple, Internet-based standards to address heterogeneous

distributed computing. Web Services define a technique for describing software components to be accessed, methods for accessing these components, and discovering methods that enable the identification of relevant service providers. Web Services are programming language-, programming model-, and system software-neutral [1].

Web Services interact with applications consuming them by exchanging messages in Simple Object Access Protocol (SOAP) format while the contracts for the message exchanges that implement those interactions are described via WSDL interfaces.

To achieve successful access to heterogeneous sources through Web Services, the proposed solution has to overcome two obstacles, syntactic and semantic interoperability of the content exchanged (job and training offers).

### 2.1.1 Syntactic Interoperability

Syntactic interoperability refers to the use of common language to the presentation of the data. The most commonly used standard for metadata representations is Extensible Markup Language (XML) [2]. XML is a simple, very flexible text format designed to meet the challenges of large-scale electronic publishing, which play an increasingly important role in the exchange of a wide variety of data on the Web and elsewhere. XML is the technology used in the proposed solution. SOAP messages form the requests and the responses from the Web Services [3]. The client invokes a Web Service by sending an XML/SOAP message, and then waits for a corresponding XML/SOAP response. Because all communication is performed in XML, Web Services are not tied to any one operating system or programming language and any organization can host this Web Service on its current infrastructure.

### 2.1.2 Semantic Interoperability

Semantic interoperability refers to the understandability of the documented information for every other user or system that retrieves it [4]. In the proposed system semantic differences need to be handled by a semantic gateway [5]. Semantic interoperability supports the integration of information offered from distributed resources. This work proposes the use of a metadata scheme based on the Eures Metadata structure for finding job vacancies and learning opportunities. The purpose of EURES [6] is to provide information, advice and recruitment/placement (job-matching) services for the benefit of workers and employers as well as any

citizen wishing to benefit from the principle of the free movement of persons.

The EURES metadata for finding job vacancies include the following categories:

- Contract type
- Schedule
- Job Category
- Area
- Education level
- Experience

A similar metadata scheme is used for discovering training opportunities. The EURES metadata for finding training include the following categories:

- Select level of education:
- Language
- Area
- Subject

The key point of the proposed service is that it facilitates organizations which offer jobs and training to join the network, on the condition that they map their metadata in the metadata scheme offered by the proposed work. By doing this, the Web Service will offer their information on jobs and training courses in an understandable form.

An XML message to each Web Services arrives in a structured form according to the corresponding XML schema.

```
<jobdata>
  <education>3</education>
  <experience>4</experience>
  <category>
    <option>3</option>
    <option>4</option>
  </category>
</jobdata>
```

Fig. 2: Xml Message send to the Web Services.

The customized Web Service understands this question and transforms it to an SQL Query according to the database of each organisation. Subsequently, it returns the results to the user(service) that requested them, after having mapped them to the aforementioned XML schema.

```
<jobs>
  <job>
    <title>Office Employee</title>
    <reference>12345</reference>
    <Area>Athens</Area>
```

```

<contact>Mr. Nikolaos Karadimas</contact>
.....
</job>
<job>
<title>Manager</title>
<reference>ADT123</reference>
<Area>Thessaloniki</as>
<contact>Nikolaos Papastamatiou</contact>
.....
</job>
</jobs>

```

Fig. 3: Xml Message returned from each Web Services

### 3 Proposed Solution

The proposed solution provides civil servants with a decision support tool with access to a tank of educational programs and job offers otherwise difficult to find and filter.

At the same time, it develops a culture of dynamic "Virtual Organizations" (VOs) [7] in the service of underprivileged citizen groups. Training will then be connected to the real needs of employers and the unemployed who have undergone training will be able to enter the labour market easier and hold long term positions.

The tools that are offered on this architecture include:

- A tool for documenting the initial situation and the needs of each job-seeking individual
- A tool for recording support sessions (meetings) that take place between social workers and individuals and the progress the latter make
- A Web Service that maps the matching metadata scheme of the described scheme to any existing database
- A Web Service for the publication of job offers (public or private)
- A Web Service for the publication of vocational training courses (public or private)
- A matching mechanism using automated content-based analysis, in conjunction with metadata search both for available jobs and training courses on an individual basis
- Several interfaces offering statistical and other useful information.
- Tools for grouping and sending the information of any individual that qualifies for specific jobs and/or training profiles
- A tool for keeping track of the jobs and training courses already proposed the

interested individual is provided only with new entries on sequential meetings

- Reporting tools for job vacancies filled, training courses successfully finished, etc

### 4 Conclusion and Discussion

The proposed solution is a great opportunity to upgrade the role and efficiency of civil services. It is a cost effective and reliable way to offer accurate and up-to-date information on vocational training courses and on job vacancies in the market. It is also a great chance for the training organizations to promote their courses and provide training relevant to the real needs of the job-market.

Furthermore, its Web Services architecture, under a common metadata scheme can find implementation in many other sectors, like e-health, e-commerce, the tourism sector, etc. Generally, there is a great need for secure networks for the exchange of data stored in heterogeneous sources. Above such platforms, several other applications can be developed that will make use of the data exchanged through these Web Services. Other fields of application are the inter-exchange of information between large companies with many branches, public authorities, schools, universities, the military, etc.

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