

Accessible Personalized Portals

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INTRODUCTION

Web portals constitute a rapidly evolving medium for transferring information and knowledge, as well as for establishing the means for cooperation and the coordination of activities among different parties. More specifically, a Web portal is a Web site that provides a gateway to resources available on the Internet or within an intranet. A Web portal typically includes a number of facilities for access and navigation of information, socialization, collaboration, and trade, as well as other user aid facilities. Although portals are accessed by a wide range of different parties, most portals are designed with limited attention to the different individual needs and preferences of Web users. As a result, they often present serious shortcomings in terms of usefulness, ease of access and use, and subjective satisfaction of the users.

Given the above, the necessity emerges for a systematic framework for developing Web portals that can be personalized according to different user needs and requirements. This article presents a design and development portal framework, along with the related methods, for producing portals that are *extensible*, *reusable*, *highly customizable*, and *accessible and usable by all*, including people with disabilities. The term *extensible* refers to the possibility of up-scaling a portal to support new functions, while the term *reusable* refers to possible alterations of a portal to address the needs of a different application context. Additionally, *customizable* refers to a portal implementation that enables end users to alter the interface with respect to their personal needs and preferences. Finally, *accessible and usable by all* refers to a portal that can be accessed and used in various types of context, and by target users with different characteristics and abilities, including people with disabilities.

Such a framework is intended to apply concepts and principles of universal access and design for all in the development of Web portals. Universal access concerns the right of all citizens to obtain and maintain access to a society-wide pool of information resources and interpersonal communication facilities, given the varieties of context (Stephanidis et al., 1998, 1999). In the context of universal access, design for all advocates a proactive approach towards products and environments that can be accessible and usable by the broadest possible end-user population, without the need for additional adaptations or specialised (re-)design.

The development of universally accessible portals entails the concept of Web accessibility. Web accessibility means access to the Web by everyone, regardless of disability (<http://www.w3c.org>). As a result, Web portals need to address the interaction requirements of the broadest possible end user population, including people with disability.

The framework presented in this article includes a Web portal architecture along with the related services, and adopts user profiling for personalization purposes, including customization of features that support accessibility and usability for diverse target user groups.

WEB PORTAL ARCHITECTURE

A multi-tier architecture is adopted in the Web portal personalization framework, as it allows separating the required user interface mechanisms from application logic and database storage. In particular, three layers are considered as necessary: data access, business logic, and presentation layer.

Data Access Layer

The data access layer is responsible for storing and communicating data between the database and the application.

Database Implementation

This layer uses stored procedures for faster retrieval or insertion in the database, reducing the amount of client side processing by looking up data, and maintaining key values and internal integrity. Furthermore, using stored procedures, the database server creates for each query a plan that includes all the information required to return the data effectively to the client. This plan is stored in the system's cache, so that it can be reused when needed (Dalton, 1997). Another advantage

of the stored procedure is that the database server can create indexes, thus increasing the speed of interaction. An example of a stored procedure is presented in Figure 1.

The ability of a Web portal to support multilingualism is a fundamental principle in order to serve people with limited skills in foreign languages. Therefore, multilingualism needs to be supported both in terms of user interface and application content stored in the database. In the database layer, a design method for the separation of multilingual and non multilingual content is used. Each database table containing multilingual content is divided in two separate tables, one containing the non multilingual content and the other containing the multilingual one, as shown in Figure 2. In such a way, no redundant information is stored.

Figure 1. Stored procedure example

```
CREATE PROCEDURE wsDocumentsArea_da_SelectAllFolders
(
    @languageid tinyint
)
AS
SELECT    dbo.tbl_da_id_folderlist.tfoliid, dbo.tbl_da_id_folderlist.tfolinumber, dbo.tbl_da_id_folderlist.tfolilevel, dbo.tbl_da_id_folderlist.tfolipath,
          dbo.tbl_da_folderlist.tfolitle
FROM      dbo.tbl_da_folderlist INNER JOIN
          dbo.tbl_da_id_folderlist ON dbo.tbl_da_folderlist.tfoliidid = dbo.tbl_da_id_folderlist.tfoliid
WHERE     (dbo.tbl_da_folderlist.tfoliuslaid = @languageid)
GO
```

Figure 2. Example of multilingual database table

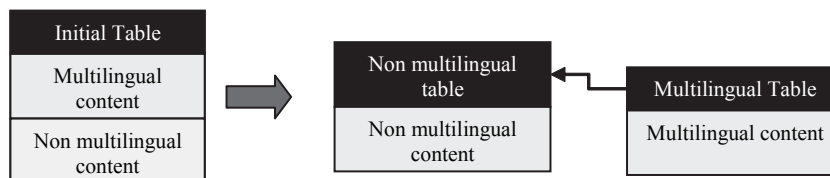


Figure 3. Example of Web-service implementation

```
[WebMethod(Description="", EnableSession=false)]
public DataSet SelectAllFolders(byte languageid)
{
    DataAccess.DataAccessObject obj = new DataAccess.DataAccessObject();
    DALParameters param = new DALParameters();

    param.AddParam("languageid", languageid);
    DataSet result1 = obj.ExecuteOleDbDataAdapter(ConfigurationSettings.AppSettings["wsDocumentsAreaSelectXMLPath"],
        "SelectAllFolders", param);

    return result1;
}
```

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