A Web-based Course for Development, Implementation and Administration of a Secure Portal within OracleAS Portal 10g

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Abstract – **This paper focuses on the organization and contents of the Web-based course for designing and implementation of a secure portal within OracleAS Portal 10g, and also on the process of training in portal administration. The course is specially developed for students and specialists who want to acquire knowledge and skills for designing websites and web-based applications that meet the increased requirements for efficiency and security.**

Keywords – **Portal, security, website, web-based application.**

I. INTRODUCTION

The rapid development of Internet technologies increases the necessity of well-trained specialists for developing and administering web-sites and web-based applications using the invented for those purpose newest technologies such as the environment of Oracle Application Server Portal 10g (OASP). This technology is notable for its efficiency and it can be used in various areas including support in solving problems with safety and reliability. Thus, the actuality and usefulness of the designed and presented in this article web-based course is proved, according to the methodological requirements of the distant e-learning. The course provides students and specialists with the opportunity to acquire the necessary knowledge in order to solve complex problems in designing databases within OASP, to provide access to the existing far databases and to design, build and administrate a secure portal.

II. COURSE DEVELOPMENT

A. Course purpose and tasks

The main purpose of the designed web-based course is to introduce the technology for development, implementation and administration of a secure portal within OASP. Here are the main tasks in developing the course:
- To differentiate a theoretical part for each course topic.
- To supply examples in order to illustrate the material for each topic.
- To provide practice on different topics.

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B. Website organization

The site structure consists of for parts with strictly defined function and size. The top two parts contain the logo and the title of the site. On the left-hand side there is a navigational menu for selecting topics, which is a group of hyperlinks to HTML documents containing theoretical parts and examples. When clicked on there the dynamical menu is situated and provides a detailed description of topics. The information is visualized in the main section of the page. Buttons for navigation have been also designed to move to different pages.

C. Theoretical part

The academic material included in the course is topical and sufficient for forming a technology for development, implementation and administration of a secure portal within OracleAS Portal 10g, which includes concepts for professional managing of the information such as scaling, safety and defense, check of correctness and compatibility, planning problem situations, etc. [3], [4]. OASP is a multifunctional platform for designing websites and web-based applications that meet the increased requirements of the content management, application development and their integration by means of widening the traditional concepts in bases from data to web content [2].

The subject area on which the development and implementation of the database is built considers students' status during the time of their academic training. This area is also used for creating students' books in subjects studied in the Bachelor's degree programme in Computer Systems and Technologies specialty at the Technical University of Varna [5], [6] and in other designed multimedia courses [7] and environments [8].

The multimedia course contains the following topics [3]:
- Installing and Configuring OracleAS Portal 10g.
- Introducing the OracleAS Portal 10g Environment.
- Using the Navigator.
- Implementation of the database – tables, views, indexes, sequences, synonyms, procedures, functions, packages, triggers and others [1] (Fig. 1).
- Creating an access to an already existing remote database.
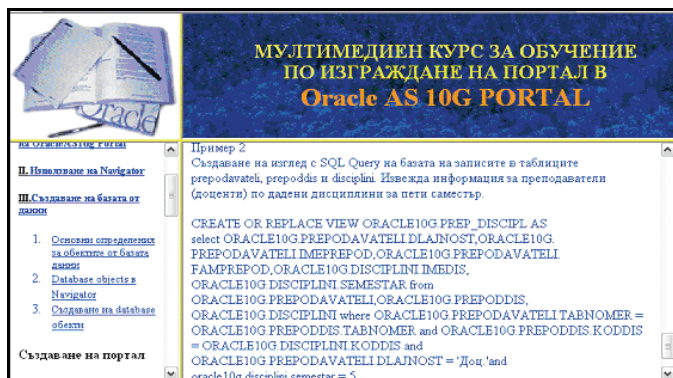
Fig. 1

▪ Building a Portal:
  ▪ Introducing Portals and Portlets; Portlet management; framework services; runtime implementation.
  ▪ Caching in OracleAS Portal 10g; types of caching – invalidation-based, validation-based, expiry-based; levels of caching.
  ▪ Creating a Portal Page - working with regions; adding portlets; creating labels; customizing the page (Fig.2).
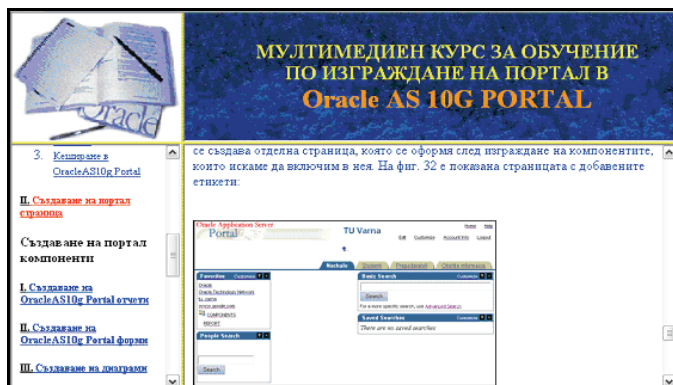

Fig. 2

▪ Building OracleAS Portal 10g components:
  ▪ Reports – building a QBE report and creating a report with the Query Wizard; using SQL for specifying the source of report data, adding parameters to reports; using reports as portlets; calling reports directly (Fig. 3).
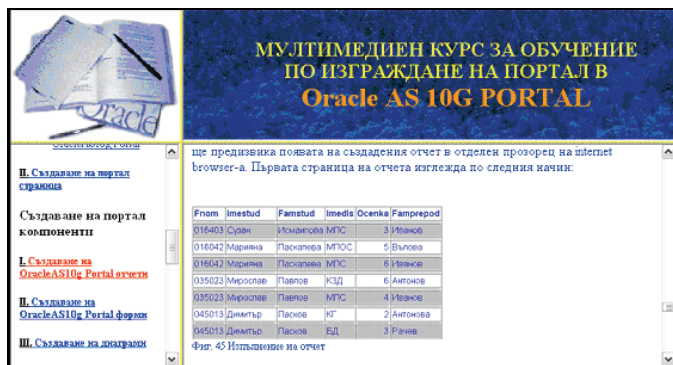

Fig. 3

  ▪ Forms – creating forms based on tables, on stored procedures and on a link between two tables – master-detail forms.
  ▪ Charts – creating charts with Query Wizard; creating charts based on a SQL statement; adding charts as a portlets.
  ▪ Calendars – building a calendar with Calendar Wizard.
  ▪ Hierarchies – building a hierarchy; navigating through a hierarchy.
  ▪ Dynamic Pages – working with HTML; using Frame Drivers.
▪ Building OracleAS Portal 10g Applications:
  ▪ Working with Lists-of-Values –LOVs; building a static LOV object and a dynamic LOV object.
  ▪ Creating Portal Menus.
▪ Building compatability in OracleAS Portal 10g web sites and applications.
▪ Data validation with OracleAS Portal 10g: using JavaScript; testing JavaScript scripts (Fig.4).
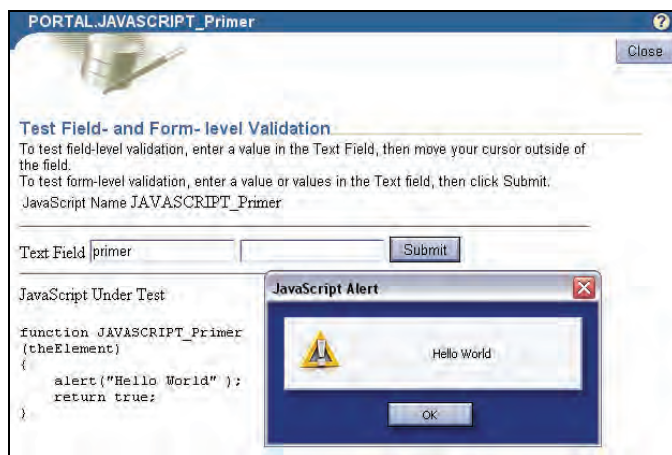

Fig. 4

▪ Using links to connect OracleAS Portal 10g objects.
▪ Integrating PL/SQL Logic.
▪ Administering OracleAS Portal 10g:
  ▪ Administering Portal components.
  ▪ Administering the OracleAS Portal 10g Environment.
▪ OracleAS Portal 10g security:
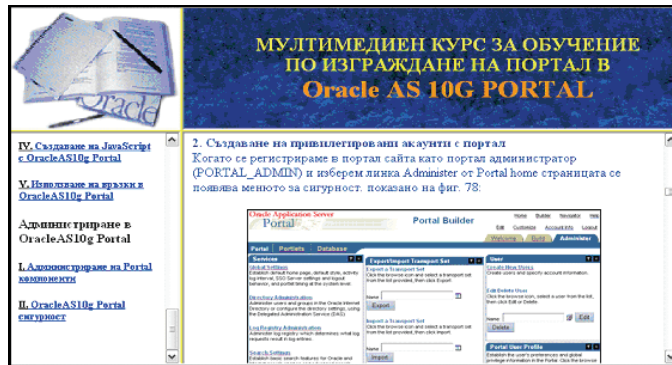 ▪ Creating privileged accounts with Portal (Fig. 5).

Fig. 5

- Creating groups and group privileges.
- Creating privileges on individual objects.
- Setting schema privileges.
- Using the Login Server.

The examples provided for each topic illustrate step by step the essence of the technology for designing, building and supporting a portal.

III. SECURITY IN ORACLEAS PORTAL 10G

Portal applications are no different from other browser-based applications or even classic client/server or terminal-based applications when it comes to the need for security. The database offers a very comprehensive set of security features that enables us to protect our data right at the source. In addition to the standard Oracle security features, the designers of Portal have provided some additional capabilities that help us deal with the stateless of the Internet. The resulting combination is a strong set of features that enable us to protect the data in our database from unauthorized access.

Oracle's database security is based on the concept of user names and passwords. Every Oracle database user is required to provide a user name and password to connect to a database. Database objects, such as tables, are owned by the user name that creates them. They are not normally accessible to other users unless specific access to these objects has been provided by use of the GRANT command [4].

If there are lots of objects and lots of users, it can become overly time-consuming to assign grants. Oracle provides support for roles - abstract users. By granting privileges to the role and then granting the role to the users, we can simplify the process of setting up the accounting group. Any change to the role is cascaded to the users automatically. You can create users, grant access to database objects, and define roles directly through the Portal interface.

There are five classes of portal users as defined by the various portal roles: Portal developers, Portal administrators, Portlet publishers, Database administrators (DBAs), Portal users (Fig. 6).
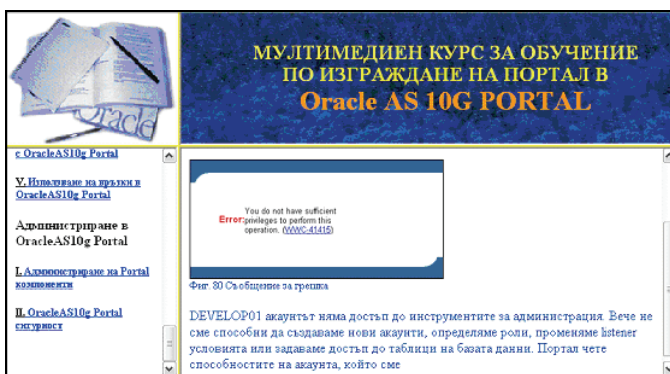

Fig. 6

The Portal security user interface is composed from the following three major functions: Users, Groups, Services.

With the release of 3.0, Oracle Portal uses the Oracle Login Server for authentication and authorization. Portal's user accounts are stored as records within the Login Server. Portal automatically forwards authentication requests from the portal layer over to the Login Server [3].

There are four types of privileges (Built-in Group Privileges) that are conferred on user accounts through predefined groups as listed: DBA - to grant database administrator privileges to the user; PORTAL_ADMINISTRATORS - to grant the user portal administrator privileges; PORTAL_DEVELOPERS - to grant the user privileges to build applications with Oracle Portal; PORTLET_PUBLISHERS - to grant the user privileges to make Oracle Portal objects (folders, categories, application components, and pages) available as portlets.

Each Portal account is mapped to a physical Oracle database schema (a database user account). Portal accounts do not have direct access to the Oracle database. Portal accounts are lightweight database users as defined to the Login Server. Lightweight users are Oracle user accounts that are valid within Oracle Portal (and the Login Server), but do not exist in the Oracle database. The accounts that we define within the portal interface will only work with Oracle Portal.

We may choose to modify an existing account. There are three of object privileges that can be granted to a user on a global basis: Page Group; Portal DB Provider и Administration.

Every major object within the portal site, such as pages, reports, forms, charts, calendars, hierarchies and folders, can have individual permissions and grants associated with them. In order to simplify the process of granting lots of privileges to individual users, Portal provides the Object Privileges panel. Through this form, you can grant portal accounts super-user privileges to all four major functional areas of Oracle Portal.

Although Portal comes equipped with several predefined groups it is a simple matter to create our own groups.

Security configurations for end-user accounts generally require more individualized settings, because we do not give them free reign to access all of the data in our database. Oracle Portal makes the overall security process easier because we can restrict access to the database completely and only allow users to view data using specified application components.

When we attach users to a group, we combine users into categories that can then be managed as a group. In some cases, groups themselves confer privileges to users directly. In other cases, the setting of the group merely creates the logical grouping, without granting any specific privileges.

It is one thing for a group to be given access to an application or component. However, the schema that owns the application also needs to be given access to the underlying database objects (i.e., tables and views).

Physical database schemas act as the containers for applications. Although the source code for our applications is stored in the PORTAL schema—the generated database packages are stored in the application schema, which owns our application.

The Login Server manages the physical connections to the database and controls the authentication of individual users. The Login Server runs as a separate instance from the Portal

Server. When a portal user requests a page from the Portal Server, the portal engine checks for the presence of an application session cookie. If the user has not been authenticated already, the portal server forwards the request to the Login Server, which then prompts the user for a portal user name and password.

Portal's security mechanisms are built directly from the standards already in place within the Oracle database.

With Portal, user security is divided evenly between Portal privileges and schema privileges. Once we have implemented security settings for our portal, the next task is to monitor its performance by Oracle Portal's monitoring tools and reports.

IV. CONCLUSION

The web-based course presented in this article is used by students in the process of their training at the Technical University of Varna. It has given them a basic understanding of OracleAS Portal 10g, the various types of objects they can create with OracleAS Portal 10g, the basic structure of OracleAS Portal 10g and also OracleAS Portal 10g components and security features. That is why the observation of the used example database for students' status in different students' books and courses helps stating the links between different objects, components and mechanisms from the initial database building to the portal functioning.

The course development could be towards preparing assessment tests and test questions for each topic, that provide the user with the opportunity to estimate the level of his/her subject knowledge.

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