Distributed Systems

Assignment 4

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* **Requirements**

Design, implement and test a distributed system that uses web services to expose the server functionalities to its clients.

* **Conceptual architecture of the distributed system**

The application is called „Online Tracking System”. It has two type of users: admin and client.

The admin can perform the following operations:

* Add package
* Remove package
* Register package for tracking
* Update package status

The client can perform the following operations:

* Log in the application
* Register in the application
* List all its packages
* Search packages
* Check package status

The operations that can be done in the application are implemented in two web services:

* AdminsWS – here are implemented the operations that can be performed by an admin
* ClientsWS - here are implemented the operations that can be performed by a client

The AdminsWS is developed in Java.

The ClientsWS is developed in .NET.

The architecture of the two web services is similar. They are both based on the Layers architectural pattern. The conceptual architecture is presented in the picture below.



The entire application is based on the MVC design pattern. This pattern separates the application into three parts:

* The model - Model represents and object carrying data. It can also contain logic.
* The view – View represents the visualization of the data.
* The controller - Controller acts on both model and view. It controls the data flow into model object and updates the view whenever data changes. It keeps view and model separate.

In the picture, presented below, you can see the conceptual architecture of the entire application.



* **UML deployment diagram**

The web services can be deployed on different servers. Also, the application can be deployed on its own server. The deployment diagram of the system is presented in the picture below.



* **Database diagram**

The database of the application contains two tables:

* The user table
* The tracepackage table

In the user table in kept the information about the users. It contains three fields:

* The username field
* The password field
* The role field

The username and password fields represent the credential with which a client can log in the application. The role field represents the account type ( admin or client ); based on this field, different types of operations can be performed by users.

In the tracepackage table is kept information about the packages. It contains the following fields:

* The id of the package
* The sender of the package
* The receiver of the package
* The name of the package
* The description of the package
* The sender city
* The destination city
* The tracking property
* The current city of the package

The diagram of the database in presented below.



* **Build and execution**

In order to build and execute this application, you should have installed on your computer the following software:

* Microsoft Visual Studio 2013 or higher
* Eclipse IDE
* MySQL Workbench 6.0 or higher

You should also download:

* Nhibernate
* Hibernate
* MySQL Connector for .NET
* MySQL Connector for Java
* JDOM

Nhibernate and MySQL Connector for .NET should be added to the ClientsWS project and the other ones to the AdminsWS project.

If you want to execute the source code you have to follow these steps:

* Import the given database into MySQL Workbench
* Open ClientsWS into Visual Studio
* Run the CliensWebService class
* Import AdminsWS into Eclipse
* Run the WebServicePublisher class
* Import DS\_Assignment4 into Eclipse
* Run the LoginWindow class

After you have performed the above mentioned steps a login window, like the one in tthe picture presented below, should appear and the application can be used.

