

Time Tracker User 3.2 Requirements Specification

1. Scope

1.1 Overview

The Time Tracker User custom component is part of the Time Tracker application. It provides an abstraction of user accounts in the system. This component handles the persistence and other business logic required by the application.

The design for this specification exists, but requires modification. The text in RED is new requirements. You are to make the additions to the existing design.

1.2 Logic Requirements

1.2.1 User Account

1.2.1.1 Overview

Users of Time Tracker will be able to self-register and obtain a user account. All users will be associated with an existing company. This component will model the following user account information:

- Company ID – the company ID associated with the user
- User ID – the unique user ID number
- Username – the login username
- Password – the login password (encrypted in persistence)
- Status – the user account status
- Creation Date – the date the user account was created
- Creation User – the username that created the user account
- Modification Date – the date the user account was modified
- Modification User – the username that modified the user account

1.2.1.2 Contact Information

The User also contains contact information, the Contact component is to be used to retrieve and persist the contact information. The contact information, which the User will use, is as follows:

- Contact Name
- Phone
- Email

1.2.1.3 Address Information

The User also contains address information, the Contact component is to be used to retrieve and persist the address information. The address information, which the User will use, is as follows:

- Address Line 1
- Address Line 2
- City
- State
- Zip code
- Country

1.2.1.4 Account Status

A user account has one of several possible pre-defined statuses:

- Active – the user account is active
- Inactive – the user account is inactive or deleted
- Locked – the user account is locked

1.2.1.5 Search Filters

This component will provide search functionalities based on a logical (AND, OR, NOT) combination of search filters. The following is a summary of the required filters:

- Return all users with a given username
- Return all users with a given password
- Return all users with first name that contains a given string
- Return all users with last name that contains a given string
- Return all users with a given phone number
- Return all users with a given email
- Return all users with address (line 1 or line 2) that contains a given string
- Return all users with a given city
- Return all users with a given State
- Return all users with a given zip code
- Return all users created within a given inclusive date range (may be open-ended)
- Return all users modified within a given inclusive date range (may be open-ended)
- Return all users created by a given username
- Return all users modified by a given username

1.2.1.6 User Authentication

The Authentication Factory component should be used for pluggable authentication strategies. For this version, the encrypted passwords are stored in the database. This component will implement an authenticator that automatically encrypts the given plaintext password and compare against the version stored in the database.

1.2.1.7 User Authorization

The Authorization component should be used to handle user authorization. The design will interact with the Authorization classes/interfaces to support adding/removing user roles. Users will act as “principals” in the context of Authorization. There will be pre-defined application roles.

1.2.1.8 Database Schema

The user account information will be stored in the following tables (refer to TimeTrackerUser_ERD.jpg):

- user_account
- account_status
- user_address
- user_contact

1.2.1.9 Required Operations

- Create a new user account

- Retrieve an existing user account by ID
- Update an existing user account information
- Delete an existing user account
- Enumerate existing user accounts
- Batch versions of the CRUD operations
- Search user accounts by filters
- Authenticate user with a given password
- Add role to an existing user
- Remove role from an existing user
- Remove all roles (if any) from an existing user
- Enumerate all roles assigned to an existing user

1.2.1.10 Audit Requirements

The component is required to allow for a boolean on any method, which allows for the modification of the data, to determine if the action is to be audited. The Time Tracker Audit component will encapsulate the actual auditing of the data. Note that the audit should be in the transaction and rolled back if the transaction fails.

The application area for this will be TT_USER.

1.2.2 JavaBeans Conventions

For all the entities described in previous sections, the JavaBeans conventions will be followed (<http://java.sun.com/products/javabeans/docs/spec.html>):

- The class is serializable
- The class has a no-argument constructor
- The class properties are accessed through `get`, `set`, `is` methods. i.e. All properties will have `get<PropertyName>()` and `set<PropertyName>()`. Boolean properties will have the additional `is<PropertyName>()`.

Note: event handling methods are not required.

1.2.3 Transaction Management

As a result of the fine grain components used in this design there needs to be a transaction management strategy, which allows a single transaction to exist that encompasses all components called for a single use case. Since this component will be deployed into an Enterprise Java Bean container, JBoss 4.0.x, a Stateless Session Bean will be used to manage the transaction. The container will start a transaction when a method is invoked if one is not already running. The method will then join the new or existing transaction. Transaction Management will be Container Managed.

1.2.3.1 User API for component

The user API for this component will exist in a Delegate object. This delegate will provide the contract for the component and interface with the EJB. The Delegate is not an EJB rather it will be a POJO. It will look up the EJB and call the related method, retrieve the results and return the results to the consumer. There will be no additional logic in the delegate.

1.2.3.2 Stateless Session Bean

The methods on the Stateless Session bean will have a transaction level of REQUIRED in the deployment descriptor. This will allow for either a new transaction to be created or for the method to join the existing transaction. For this release we will use a Local Bean and not a Remote Bean. There are a few obstacles, which will need to be addressed:

- No File IO from within the EJB so ConfigurationManager cannot use a file. Values can however be stored in the Deployment Descriptor.
- All parameters passed to/from the Session bean must be Serializable, however the Filter Object in Search Builder 1.3.1 is not Serializable. This is being addressed and will be fixed.
- The Session Bean should not have any class level variables to store things like the DAO. If it does have a class level variable it must be transient, therefore after activation it will have a value of null. Any of the approaches outlined below are acceptable:
 - Have a class level dao attribute and only access it via a getDAO() method which checks for null and sets the dao attribute if it is null.
 - Like the first method have a class level attribute but on creation or activation load the DAO to the class dao attribute. You must then ensure that under all scenarios that the attribute will be not null.
 - Use a singleton to act as a DAO cache
 - There may be others, and you are not limited to one of these.
- No threads can be created within the EJB.
- Review the Sun J2EE specification for any other limitations.

All Business logic for the component will reside in the Stateless Session Bean. There will be no logic in the delegate or in the DAO. There is one exception to this, in that the Audit functionality will exist in the DAO.

1.2.3.3 DAO

The DAO's must retrieve the connection that it uses from the configured TXDataSource in JBoss. The configuration of the DataSource should be externalized so that it can be configured at deployment time.

All audit functionality will exist in the DAO.

1.3 Required Algorithms

None.

1.4 Example of the Software Usage

The Time Tracker application will use this component to perform operations related to user authentication and authorization.

1.5 Future Component Direction

Other database systems maybe plugged in for some client environments. Multiple user stores may be used for the same client environment.

2. Interface Requirements

2.1.1 Graphical User Interface Requirement

None.

2.1.2 External Interfaces

None.

2.1.3 Environment Requirements

- Development language: Java 1.4
- Compile target: Java 1.4, Java 1.5

2.1.4 Package Structure

com.topcoder.timetracker.user

3. Software Requirements

3.1 Administration Requirements

3.1.1 What elements of the application need to be configurable?

None.

3.2 Technical Constraints

3.2.1 Are there particular frameworks or standards that are required?

- JavaBeans (<http://java.sun.com/products/javabeans/docs/spec.html>)

3.2.2 TopCoder Software Component Dependencies:

- Configuration Manager
- DB Connection Factory
- ID Generator
- Encryption
- Authentication Factory
- Authorization
- Search Builder
- Time Tracker Common
- Time Tracker Audit
- Time Tracker Contact

**Please review the [TopCoder Software component catalog](#) for existing components that can be used in the design.

3.2.3 Third Party Component, Library, or Product Dependencies:

Informix Database.

3.2.4 QA Environment:

- JBoss 4.0
- Windows 2000

- Windows Server 2003
- Informix

3.3 Design Constraints

The component design and development solutions must adhere to the guidelines as outlined in the TopCoder Software Component Guidelines. Modifications to these guidelines for this component should be detailed below.

3.4 Required Documentation

3.4.1 *Design Documentation*

- Use-Case Diagram
- Class Diagram
- Sequence Diagram
- Component Specification

3.4.2 *Help / User Documentation*

- Design documents must clearly define intended component usage in the 'Documentation' tab of Poseidon.