

GREENLIFE – A MMORPG THAT STIMULATES AN ECOLOGICAL BEHAVIOR

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ABSTRACT. In recent years, MMOGs (*Massively Multiplayer Online Games*) had become popular. In the same time, more and more ways of implementing interactions between real world and game's virtual worlds are developed. These facts gave us the idea to develop GreenLife application, as a solution of involving people in recycling and ecological activities. GreenLife is a Massively Multiplayer Online Role Playing Game and its basic idea is recycling business management. The game resources are increased based on players behavior in their real life.

Key words: multiplayer game, online gaming, role-playing game.

1. INTRODUCTION

Massively Multiplayer Online Role-Playing Games (MMORPGs) are a new class of *Multi-User Domains* (MUDs) - online environments where multiple users can interact with each other and achieve structured goals. The first MUD - an adventure game in a persistent world that allowed multiple users to log on at the same time - was created in 1979 by Roy Trubshaw and Richard Bartle [1].

Even if MUDs descended from *Role-Playing Games* (RPGs), the two genres emerged around the same time and co-evolved beginning in the early 70's and became popular during the 80's. Both games allowed users to create characters based on numerical attributes (like power, dexterity, intelligence) and combat-oriented roles (ie. warrior, archer, healer, cleric, druid etc) with different strengths and weaknesses. Game-play typically revolved around a combination of interactive story-telling and logistical optimizations under the guise of slaying monsters and attaining higher levels and skills.

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1998 *CR Categories and Descriptors.* I.2.1 [**Computing Methodologies**]: Artificial Intelligence – *Applications and Expert Systems - Games*; I.6.8 [**Computing Methodologies**]: Simulation and Modeling – *Types of Simulation - Gaming*.

In RPGs, a designated Game Master controlled the outcome of events based on dice-rolls and references to charts and tables. In MUDs, this was controlled by the server. As the graphical and processing capabilities of the modern personal computer increased, and as accessibility to the Internet became widely available, it became possible in the early 90's to build MUDs with graphical front-ends.

Ultima Online, launched in 1997, is recognized to be the first MMORPG - a persistent, graphical, online environment that allowed thousands of users to be logged on at the same time. The second MMORPG, *EverQuest*, launched in 1999 was the most popular MMORPG in North America for more than 5 years. [8] Today hundreds of MMORPGs are available over the internet, some of them with millions of registered users and thousands online users in every moment. According to statistics presented on Gamespy.com, for *Half-Life* and *Counterstrike* games there are more than 50.000 users online everyday and Lineage games had more than 2.000.000 (paying) subscribers at the end of 2004. The average age of MMORPG players is round to 26, with a range from 11 to 68. The lower and upper quartile boundaries are 19 and 32 respectively. [7]

In the same time, the connection between the virtual worlds created in MMORPGs and the real life became stronger and stronger:

- users with very good abilities in playing a particular game are selling virtual items (weapons, buildings or technologies) or even their own accounts via e-Bay;
- game creators are selling different real objects that allow game users (based on some codes) to unlock game facilities;
- certain amounts of virtual resources could be obtained in exchange for real money.

The popularity of MMORPGS and the various possibilities of influencing the virtual world through real world actions gave us a perfect context to imagine a way to involve people in recycling activities. We have imagined a virtual world modeled around the recycling concept and business management. The solution that we proposed is called GreenLife. Its core consists of a MMORPG and two distinct components that provide two ways of supporting the game from the outside world:

- *ShopSmart* program: using your eco-card to get some money for eco-friendly shopping;
- *Recycling* - get in-game resources for equivalent amounts of recyclable materials taken to Collecting Centers.

2. GREENLIFE DESCRIPTION

The game site opens with a game setting (planet Earth depleting its resources, extracting more and more each day, recycling very little) and description (what are the objectives of a player and how they can develop their recycling business).

The basic idea of the game is recycling business management. Each player starts with an amount of money. The first thing a player has to do is to buy one or several locations. Locations are defined as sectors of the areas corresponding to cities. Each city has a certain amount of waste that can be recycled. Each sector represents a percentage of the city's recyclable waste. Depending on the size of the city and implicitly on the amount of waste, each location (sector) has a price.

After buying one or several locations, the player buys/builds recycling facilities at each location. These facilities can be upgraded as the game develops. A facility converts waste into a certain amount of recycled resources per day (depending on the technology level of the facility). These resources (glass, tin, wood and plastic) can be sold for money at the market (the market will fluctuate daily depending on the amount of that kind of resource sold overall the preceding day). The market will use real-world recycled resource prices as reference. As the game develops, the player can buy new locations and build new facilities in neighboring areas thus expanding the profits. Also, for each facility, the user can build one specialization annex that boosts the output of one specific resource (glass, tin, wood and plastic).

Players can interact with each other by chatting, forming alliances and competing for better locations (takeover). A player can try to takeover a certain location from another player. The prerequisites for this action are: the owner of the location the player wants to takeover is within two levels (overall technology level) of him and the hostile player either already has a location in that city or is part of an alliance within which one player already has a location in that city.

The player can protect himself against takeovers by investing in community support (can be achieved by giving out some of the money for recycling education at the community level, also increases the amount of recyclable waste for that location) and profitability. The outcome of a takeover action is computed depending on the technology level and profitability of the hostile player versus the community support and profitability. When a takeover succeeds, the hostile player obtains the respective location but not the facility. This can be bought (and downgraded 1 or 2 levels) from the previous owner for a certain amount of money (which the previous owner receives). The hostile

player also has the option of building a new facility from scrap and not paying for the existing one.

3. GREENLIFE ARCHITECTURE

Most of commercial MMORPGs have been implemented as client server systems where the global game state consisting of positions and states of all players is managed in a centralized way. The centralized control has advantages in keeping security high and implementation easy. The model used for our MMORPG is based on a desktop client application. The decision stays on the advantages gained by using Presentation Foundation and on the need to have an executable proof of concept version. Figure 1 contains the architectural diagram of GreeLife system. The main components of this diagram are:

- *GreenLife MMORPG* - available as a desktop application version (in future it will be replaced with a web application version);
- *GreenLife Game Service* - WCF web service that facilitates the access to the database.
- *GreenLife Mobile (Collecting Center, Shopping Center)* - the mobile device version of the game. Communication will be achieved using Mobile Service

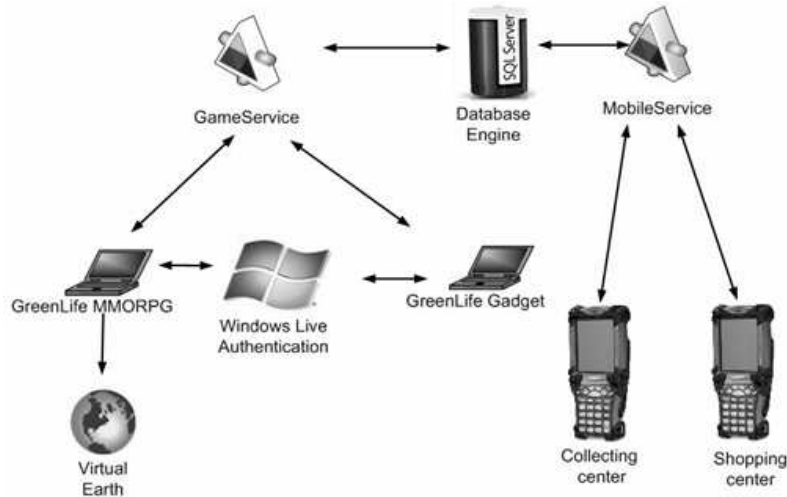


FIGURE 1. GreenLife architecture

Green Life database has the following structure:

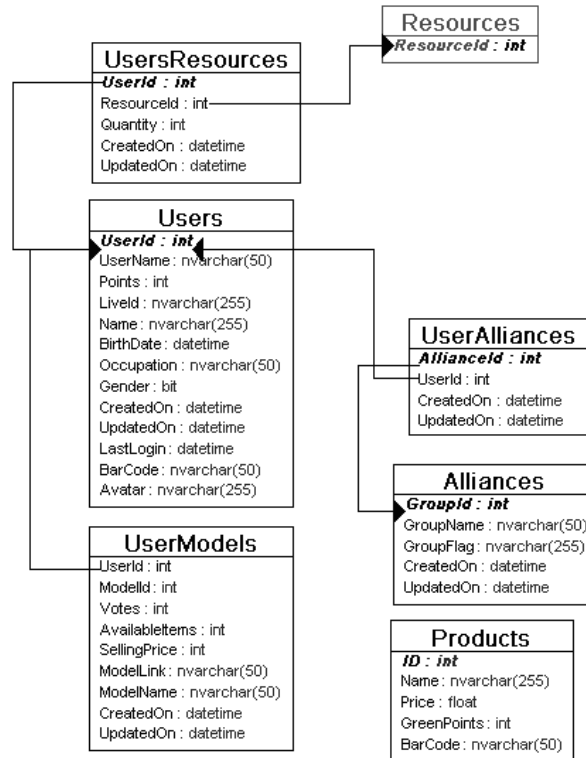


FIGURE 2. GreenLife user management tables

Users, *Alliances* and *UserAlliances* are tables that contain information about GreenLife registered users and groups of interests formed by them during game play.

UserModels stores 3D models of factories build / owned by a specific user.

UserResources table contains amounts of specific resource (glass, tin, wood and plastic) owned by a user. The records of *UserResources* together with *Users.Points* field help users to develop and increase their recycling business.

Products is an isolated table which contains the list of items that can increase game points of an user if they are obtained from certain point of sales (like hypermarkets, supermarkets or petrol station chains) involved in GreenLife system.

Locations, *SectorOfLocations*, *Resources* and *ResourceInLocations* describe the waste quantities and their position on Earth map. Each user will own one or more factory models (stored in *FactoryModels* table) that will exploit the waste of a specific location sector.

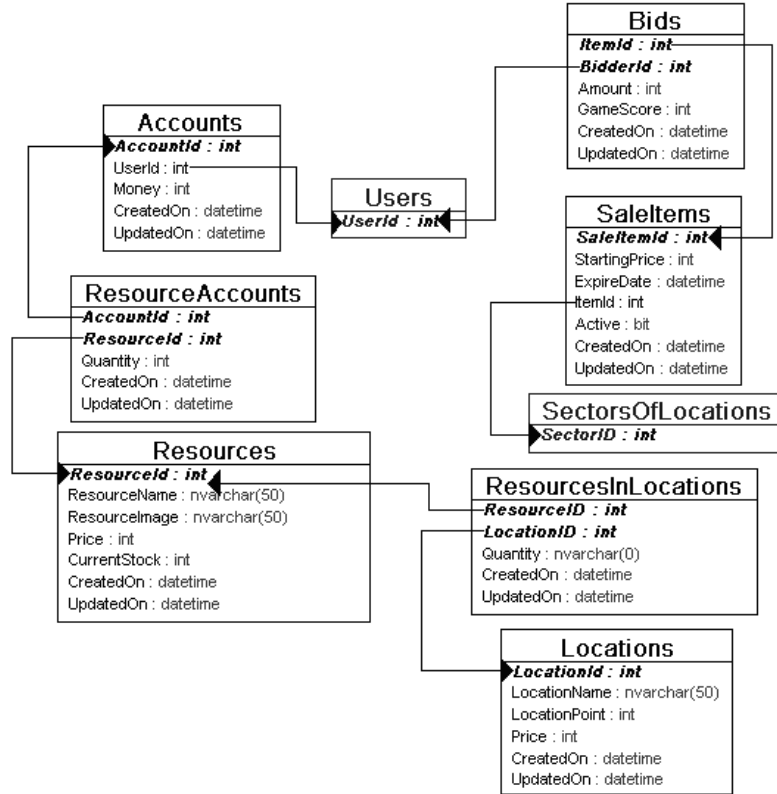


FIGURE 3. GreenLife resources/points management tables

Accounts and *ResourceAccounts* define the type and quantity of resources and money owned by a user and which is not visible for other competitor in the game.

Factories, *FactoryModels*, *FactoryModelAnnexes* and *TechnologyLevels* store 3D models descriptions used for graphical representation of factories and their annexes and their capacity and cost of exploiting the waste from a certain location sector.

Different technologies have been used in our implementation. We mention here *Windows Presentation Foundation* - that provides the ease of creating a rich user experience, with minimum of code behind, *Windows Communication Foundation* - for reliability and security of data transfers, *Microsoft Live Labs Volta* and *Virtual Earth v6 API* - for game map representation and *3dvia ShapeIt* for building tridimensional models of recycling factories.

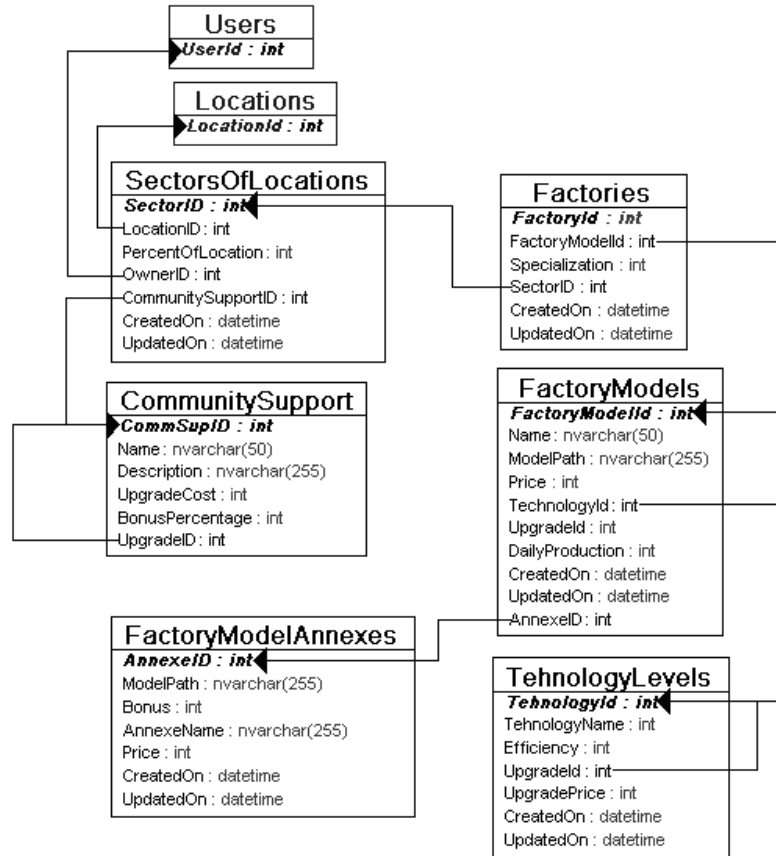


FIGURE 4. GreenLife map locations management tables

4. CONCLUSIONS

GreenLife MMORPG solution is characterized by the following novelties:

- it is a new type of MMORPG, considering the ecological and economical perspective;
- it redirects game dependence towards ecological education;
- it is a stronger bound between real life and virtual life through interaction with economic agents and the involvement of non-playing relatives and acquaintances;
- a new model of eco-game of great impact with the young and many others. The existing solutions of this kind were limited to simple action and a small target, preschools through teens in general.

We think that GreenLife MMORPG solution is interesting as a commercial project, mainly because of the interaction with the real world, and the advantages it presents in the collaboration with hypermarket networks and recyclable waste collecting centers. Offering low implementation costs, and the chance to promote the game easily (advertising in collaboration with markets), our solution seems a good opportunity for a successful and fast growing business. We believe that the catchy story behind the game and the attractive graphics, together with the rewards from the real world will contribute to the success of the idea.

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