

Adaptable Alternate Reality Games Platform

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Abstract: In this paper, we present an alternate reality games platform that facilitates the creation of ARG projects with different themes and sizes. The platform is well integrated with the most important social media networks, thus facilitating both the involvement of the public and the creation of a more engaging interaction for the participants. A cloud-based architecture was used in order to allow the platform to easily accommodate projects of various sizes and to provide a good level of scalability. The platform is fully localizable in any language and multiple languages can be used at once to create projects that target users from different countries. An initial project that uses gamification to create an immersive learning environment has been created around the developed platform. The project combines professional and public feedback in order to provide an enhanced learning experience.

Key-Words: alternate reality game, cloud computing, learning, mobile applications, transmedia

1. Introduction

Alternate Reality Games - ARG are a category of serious games that focus on a game play that combines real world activities and transmedia storytelling to deliver a story that may be altered by participants' ideas or actions [4]. Transmedia, as defined by [3], represents a story that unfolds across multiple media platforms, with each platform making a distinctive and valuable contribution to the whole.

One of the first ARG projects was *The Beast* [3], a game developed to promote the release of the movie *Artificial Intelligence* by Steven Spielberg. Another successful ARG was *I Love Bees* developed by Microsoft to promote the launch of the Game *Halo 2* [4]. Besides promoting movies and video games, ARGs have also been successfully applied to raise people awareness regarding important environmental or social issues, like in the project *World Without Oil* [8].

While various ARGs projects have been created for many years, it was only recently that they have been used as a form of educational game [7]. Several recent projects dedicated to facilitate learning, such as the ones presented in [5] and [6], have shown the potential of

alternate reality games for creating immersive learning environments.

In this paper, we present a cloud based platform that can be used to easily create ARG projects with various themes and sizes. The proposed platform expands upon existing approaches on several directions such as scalability, combining public and professional feedback, integration with social media networks and support for multiple languages and cultures.

In order to improve the scalability of the platform and to make it appropriate for creating learning ARG projects with different numbers of participants and themes, a cloud-based approach has been chosen.

The platform is integrated with the most important social networks in order to facilitate the interaction between participants and the public. In the future we want to analyze how the integration of social features influences the participants' motivation and involvement in the project.

The second section of the paper presents the developed platform in more details. In the third section of the paper we present the cloud based architecture.

The fourth section presents the development approach, based on the

latest web technologies, used for creating the mobile applications included in the platform.

The fifth section introduces the first educational project implemented using

the developed platform, the Web Academy of Journalism - WAJ. The last section summarizes the paper and shows some of the future research directions.

Table 1. Platform Entry Points

Public			Contributor		Moderator / Administrator
Website	Mobile	Facebook, Twitter, YouTube / Vimeo	Website	Mobile	Website

2. Alternate Reality Games Platform

The developed platform is designed to allow the creation for Alternate Reality Games that focus on user-created contributions.

Given the different visualizations and options that the platform should display to different kinds of users, the following user roles were defined: public, contributor, moderator and administrator. A detailed description for each of the four roles is given in Table 2.

Table 2. User Roles

Role	Description
Public	Views and rates contributions.
Contributor	Creates contributions based on the suggested tasks.
Moderator	Evaluates the contributions, bans users.
Administrator	Can change various options from the Administration area.

Table 1 shows with which modules of the proposed ARG platform will the public, the contributors, the moderators and administrators interact. As it can be seen, the web application represents the main access point to the platform, while the mobile application and social services contribute to a better experience.

The web application, shown in Figure 1 features a responsive layout in order to provide a good user experience across various devices. Moreover, the application

adapts to the capabilities of each browser, using features like local storage and the HTML 5 Canvas when they are available.

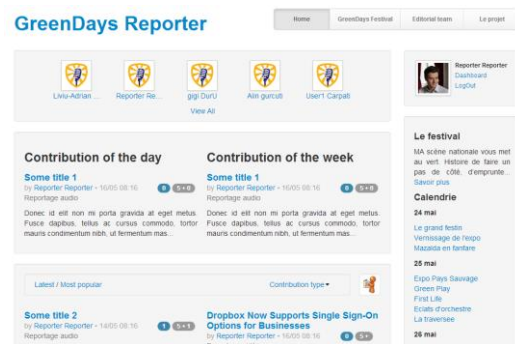


Figure 1 Web Module

Figure 2 shows the design of the contributor's profile. The progress of a participant inside the game can be tracked through the number of received points, the current level or the number and types of the received badges.

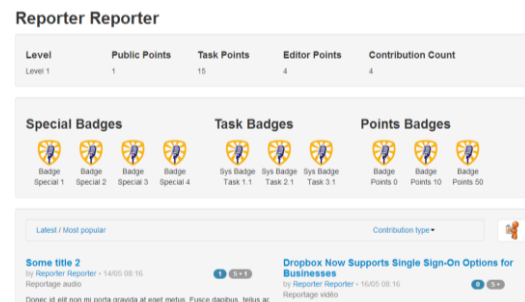


Figure 2. Contributor Profile

Points and badges can either be assigned manually by the moderators or automatically by the platform based on the rules defined in the administrative area of the platform.

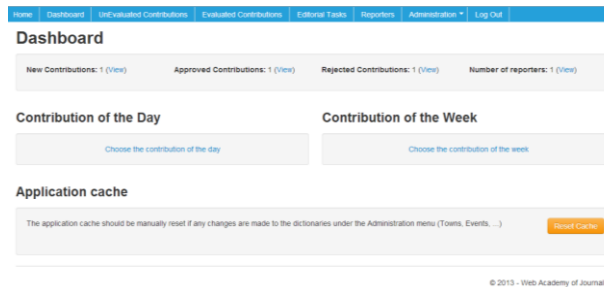


Figure 3. Moderator Dashboard

The administrative dashboard shown in Figure 3 offers an overview of the current state of the platform. From this dashboard the moderators and administrators can check the number of new, approved and rejected contributions as well as the number or registered participants. The “contribution of the day” and the “contribution of the week” can also be viewed or changed. Similar to many other features of the platform, the contributions of the day and week can be enabled or disabled from the administration area. Figure 4 shows the configuration page for the badges awarded automatically by the platform to the contributors that collect a certain number of points. The number of points, the picture and the name of the badge are fully customizable.

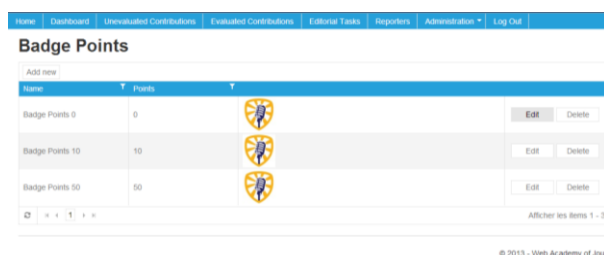


Figure 4. Configuration for the points badges

Besides points pages, the platform also support task badges that are automatically assigned based on the

number of completed tasks and special badges that are manually assigned by the moderators to mark specific accomplishments.

3. Cloud-based Architecture

The selected cloud platform is Microsoft Windows Azure [9], as it perfectly integrates with the rest of technologies used in the project, but the platform can be adapted to use other cloud providers if needed.

The proposed platform relies on a multi-tier paradigm for both the client and the server implementations as shown in Figure 2. Client implementations use local data persistence solution in order to avoid unnecessary server requests, thus both reducing the workload on the server and improving the user experience.

The server module is optimized for deploying in cloud computing environments and uses the latest technologies in the Microsoft .NET Framework to both provide enhanced scalability and to facilitate the development of new functionalities in the future. By separating the functionality into different layers, the scalability of the platform is enhanced based on the possibility to distribute the developed system on multiples servers. Moreover, multiple instances of each component can be used in parallel to handle higher amounts of traffic and increased volumes of media processing and conversion requests.

The **Communication Layer** facilitates the communication with the client implementations using HTTP requests, Web Service Calls and Socket Connections. Thanks to the multiple communication methods supported by this layer, client side applications can be implemented using a wide array of technologies.

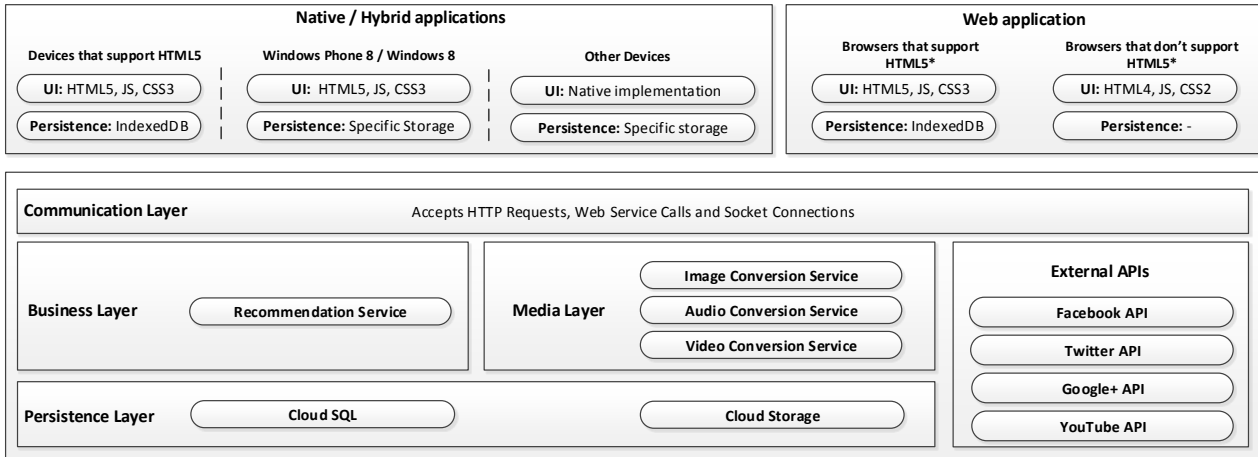


Figure 5. Multi-layer architecture

The **Media Layer** incorporates the services dedicated to image, audio and video processing, which includes adding branding content and conversion to HTML5 formats. Given the time required for processing, upon uploading to the platform, each media file is added to one of the three specialized queues, based on its type. Image files are converted to jpeg format, in up to three different resolutions, based on the quality of the initial resolution. Given the fact that there is no audio or video format that is supported among all browsers, audio files are converted to OGG and MP3 formats and videos are converted to OGG and MP4 formats. If needed, the media processing can be distributed by running multiple processing services in the cloud.

The **Social Networks Layer** was implemented to facilitate the integration with the most important social networks, including Facebook, Twitter and Google+. The video sharing platforms Vimeo and YouTube are also supported, thus allowing video and audio content to be provided to a broader audience. A wrapper that unifies the different APIs exposed by the social networks has been developed in order to facilitate the integration of new social media features in the future.

The **Business Layer** incorporates a simple task recommender system that takes into consideration the level of the participant to suggest possible new tasks. A more advanced recommendation engine can be implemented in the future to better guide the participant in his learning experience [10-12].

The Persistence Layer relies on cloud storage for storing both relational data and the media files created by the media processing services.

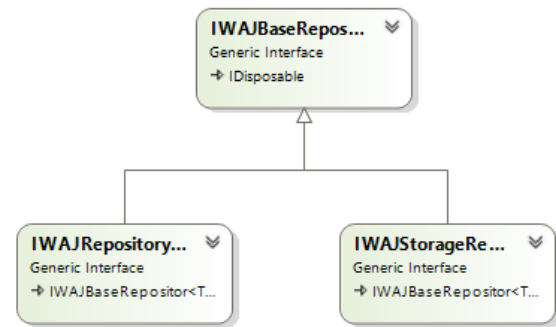


Figure 6 Inheritance hierarchy between the repository base classes interfaces

Figure 6 presents the inheritance hierarchy between the repository base classes interfaces. The IWAJStorageRepository interface includes the prototypes for methods used to store and retrieve files such as photos, documents and movies. Using Dependency Injection, based on Ninject library [13], the application can easily be configured to store the files either in a database or in a less expensive storage such as Microsoft Windows Azure Storage [9] or Amazon S3 [14].

4. Hybrid Mobile Applications

Compared to many existing ARG projects, such as [5], in which the participants can only use specific mobile devices, the development approach used for the mobile implementation uses the latest

web technologies such as IndexedDB and HTML5 Web Storage to offer portability across different platforms as well as a rich user experience [15].

The application can either be used directly from the mobile web browser, or can be installed using a thin native wrapper, such as Adobe PhoneGap [16], that provides the required translation from JavaScript method calls to native method calls like shown in Figure 7.

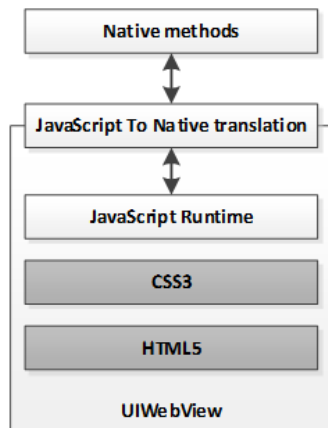


Figure 7 Hybrid Mobile Applications

The application works on all devices that comply with the HTML5 standard specifications including both smartphones and feature phones.

5. Web Academy of Journalism

The first project implemented using the proposed platform is the Web Academy of Journalism – WAJ, created in collaboration with a French cultural institution, MA Scene Nationale. The goal of the project is to allow the participants to discover and learn how to become professional journalists, but also to promote cultural mediation and to attract the public’s attention on the festivals organized by MA Scene Nationale.

The participants will play the role of professional journalists, constantly receiving tasks and feedback from a professional redactor, corresponding to the role of puppet master, commonly found in ARG projects.

The public’s access to the contributions created by the wannabe journalists will be facilitated by the deep integration with the most important social media

networks. All the published contributions are also available in Really Simple Syndication – RSS format.

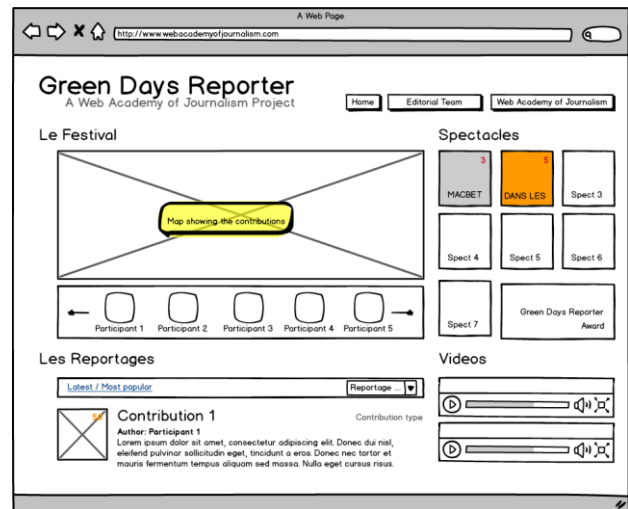


Figure 8 Mockup for the WAJ web module

A mockup presenting the web interface for the Web Academy of Journalism project is shown in Figure 8.

6. Conclusion

In this paper we have presented an Alternate Reality Games platform that facilitates the creation of games centered on user created content. The developed platform is easily adaptable to gaming projects of different sizes and themes. In order to build a platform that can easily be adapted to projects with different themes, besides using the latest technologies and development patterns, we have also incorporated multiple extensibility points. In order to easily accommodate projects of different sizes the developed platform has been optimized for deployment in cloud computer environments.

While the platform can be used for different types of games, we are currently investigating its potential for learning gamification. Compared to existing educational alternate reality games projects, the Web Academy of Journalism project combines professional and public feedback and is well integrated with the most important social networks.

Based on the feedback gathered so far for the current version of the platform, we are currently implementing a new version

that will add support for assigning the participants to different groups as well as for creating collaborative tasks.

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