# BROWSER GAMES FOR ONLINE COMMUNITIES

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## ABSTRACT

*Games played directly inside the web browser have many benefits. Browser games do not need software installation. Furthermore since the web has become the ultimate collaboration environment, the games are available for numerous players that can play in collaborative fashion. Through history online communities have birth alongside with browser games. Nowadays online communities have achieved massive user numbers and those can be important part of the browser game itself. This article targets at analyzing and categorizing of browser games. We also discuss financial opportunities relating to browser games and technologies used in those.*

## KEYWORDS

*Browser Games, Game Analysis, Online Communities*

## 1. INTRODUCTION

Multiplayer games played inside a web browser have benefits over traditional computer games. Browser games offer a good platform for social gaming, because players can interact with each other – attack other players, form alliances, create armies, and work together to accomplish greater goals.

The fact that games are played inside a web browser considerably lowers start-up threshold of gaming as software installation is not needed. The browser games are available also for players, who have never bought a single computer game and have no intensions to ever do so. Browser games can be played anywhere with normal web browser and in short time periods in the middle of player's normal life, few moves in a browser game takes only few minutes instead of hours.

As start-up threshold is small, browser games are easy to advertise to friends. Friends playing some browser game are a strong lure to get people play a certain game. This is especially typical in Facebook [1] application distribution, because people send invitations to joining applications to their friends. Facebook applications also encourage this behaviour by offering bonuses for player with lot of friends playing or at least added the same application to their Facebook accounts.

Huge online communities have been formed around browser games and gaming ecosystems. Many browser game forums have hundreds of thousands users. Furthermore, many browser game clans have created their own forums, Wikipedias and IRC-channels to support gaming and associated activities. Successful strategy game clans must be well organized and the need of good communication strategy is obvious.

Instead of computer controlled foes, a browser game can offer a battlefield, where each opponent is a human player. This can be very strong motivator for competitive players to play browser games. Artificial intelligence controlled opponents can also be used as opponents, or end antagonist like Natars in Travian [2]. In Travian strategy game, Natars appear after almost a real-time year of intensive player against player battle to prevent the leading player alliance from winning the game.

The player needs no installation packages to play browser games, therefore no money can be gain from selling those to the players. We believe this is the future of game industry. In future people do not walk into game store to buy games; they just play them through their web browsers. The profit of the game developers must come from somewhere else than selling game packages. They can make money by advertising, selling new units, other game resource or extra features to the players.

Although time for single move in a browser game can be very short, the duration of a browser game is usually very long or eternal. Therefore it is possible to create richness impossible to normal multiplayer games. For example, some Hattrick [3] players have played the game with the same team more than ten real-life years.

Even though browser games have existed for some time now, there have been no comprehensive studies about the subject. This paper focuses on browser games properties and categorizing those. We have discovered five common features of the browser games and made a categorization, which divides the browser games into five categories. We also discuss financial opportunities involved in browser game genre. These results were found based on a survey, which targeted important browser games. This paper is based on an earlier conference article [4], but it has been extended with respect to numerous technical details as well as community dimension.

We proceed as follows. In the next Section we briefly discuss history of browser games. In Section 3 we present our definition of browser game. In Section 4 we discuss our categorization of browser games. In Section 5 we discuss social communities, which have birth alongside browser games. In Section 6 we briefly look at technologies used in browser games. In Section 7 we discuss financial opportunities included in browser game genre. Finally, related work is discussed in Section 8, before concluding remarks in Section 9.

## 2. HISTORY OF BROWSER GAMES

Browser games have similarities to multi-user dungeons (MUDs), which appeared in late 1970s [5]. Those allowed multiple players to explore virtual dungeons, despite the fact that those focused on social interaction between players. Combat systems were usually rather simple. Like browser games, MUDs were multiplayer games, game time was very long or eternal and each player had one account and therefore controlled a single character. This was also the time when the first online game communities started to form. Players noticed that they enjoy playing with certain people and formed their communities to ensure they would be online to play at the same time.

Later came Earth 2025, released in October 1996, which claims to be the first of the generation of unique, interactive games designed to be played directly on the web [6]. Since those days web access has become more and more general, and this growth has led to an increasing number of browser games. People spend more time on the web than ever before. Web browser games have come popular and spread into many different game genres. Nowadays game communities are easily formed, because many games offer build in forum in game pages. Many clans build their own private forums, in addition to public one.

One main motivator in recent growth of browser games is the popularity of the Facebook social utility [1]. Anyone with some programming experience can write his or her own browser game and offer it to the other users of the Facebook. Facebook had more than 400 million active users in July 2010 and popular Facebook browser games can have fifteen million or more active users monthly [7]. For example, a popular browser game at the moment Mafia Wars [8] had more than 23 millions monthly active users in January 2010. There are more popular applications in Facebook, which are listed as game applications, but those do not fill our definition of a browser game.

## 3. BROWSER GAME PROPERTIES

To fill our definition of browser game, a game has to fulfil five features. The features have been found by surveying number of browser games. In the survey we played the game at least the time needed to research all the important features of the game. The testing time for a single game was from an hour to more than a year.

Browser games are for (i) **multiplayer gaming.** The game has a lot, probably thousands of users, who can interact with each other. There is more interaction than shared score list between the players. Usually players can, for example, attack each other and form alliances. There are usually several servers for the game and each of those is running a separate instance of the game. Active players can play their favourite game in several servers at the same time.

The games are played in the (ii) **web browser**. Usually no installation of any application is needed. Though some games offer graphic packages, but installation of those do not modify the rules of the game. Packages affect only to the graphic of the game. In case of Facebook application, the player has to allow the application to access his or her account, however this operation is not regular software installation.

The games are (iii) **always on**. It is possible to get attacked or receive message even when not online. Some games allow sitters, a player can name couple of other players who can log in his or her account when he or she is not online. Sitters can play using the account like the original player. This can be especially helpful during the players' holiday trips or other pauses in normal gaming. It is also possible to gain some advantage by playing in different timing than other players, as it is hard to defend against sneak attacks that happen during a night time.

The (iv) **duration** of games is very long or eternal. Game time of browser games can go on in real time, the game can be turn-based, or it can queue actions and for making them happen on a time base. The games are usually restarted after the end. In some intensive browser games the length of a single match is very short, just few minutes; however the ranking of the players is continuous.

Each player has (usually) a single (v) **account**, and he or she controls one character, group or nation. Some games offer second or even third account as additional feature if the player pays an extra fee. But those extra accounts are not used in the same instance of the game as the first account. Those can be used, for example playing with other character class than the original account was created.

## 4. BROWSER GAME TYPES

Browser games can be divided into several different types. Browser games in general are good at creating large worlds with a lot of players, which explains the large number of strategy games and role-playing games. Several games also combine these two types, for example, Dogs of

Seas [9] and Dark Orbit [10]. We have divided browser games into five types. In the following we go through those five types.

(i) **Strategy games** emphasize decision-making skills of the player. There is usually a large world with a lot of players and player formed alliances. The player has to battle his or her way to the top. Travian [2] is a good example of strategy game. In the start of the game the player gets one village and he or she has to build powerful nation. Players can form alliances and wage wars. Length of one Travian game is about a year.

(ii) **Role-playing games** concentrate on character development and role-playing. The player usually controls only one character instead of a nation or group. A good example of role-playing games is Forumwarz [11], a parody role-playing game that takes place on the Internet. In Forumwarz the player tries to wipe out Internet forums.

(iii) **Manager games** put player into decision-making position of a team or other group. An example of those games is Hat Trick [3], a popular football manager game. In Hat Trick each player gains control of a football team and competes against other player's teams. The players registering in the game are divided into divisions based on their real-world residence location and matches are played some once a week. Outcome of the matches are calculated by the simulation engine of the game, based on the players' attributes and other variables.

(iv) **Shooter games** are perhaps the most simple browser games. The goal is to shoot target and get points. Games vary, but the goal is always the same. Example of this group is Stick Arena [12]. Were players run around the maps, picking up weapons along the way and use those to kill opponents. The players are ranked using numbers of deaths they have inflicted.

(v) **Social networking games** are the last group. There is no combat or character development; instead the game focuses on social interaction. The Habbo Hotel [13] is an example of those applications. The Habbo Hotel also offers virtual goods for sale and the player can decorate his or her avatars' apartment with those.

## 5. SOCIAL COMMUNITIES

Many browser games have inspired the creation of large social communities. For example, Hattrick [3] is played in 124 countries and there are more than 850 000 active users. Each country has its own forums and in Hattrick, there are over 60000 forum posts each week. Including other forums, each league gets its own forum, helping the eight players in same league to communicate. Usual Hattrick forum conversations relate to the game mechanics as beginners seek help or hint how to develop their teams. Hattrick is a very slow processing game, only one league match is played in a real-time week and forum discussions and other activities (e.g. player transfers) are essential part of the game. Hattrick has been running since August 1997 and current season, which started in March 2010 is number 42 [14].

In strategy games, successful clans have also created their own private forums for inner communication. Those private forums are protected by passwords. Private forums help the players to coordinate attacks, ambushes, resource transfer operations, inform other clan members and other activities needing good timing and coordination between clan players.

Private Wikipedias are also used tool for inner communication of player clans. Those can be used e.g. experienced players to share their knowledge. Clan beginners can learn inside tips about the game from these private pages. While forums are used communication, Wikipedias are places to store static information.

IRC-channels can be excellent fast communication method. It is possible to reach even whole clan with message. However, effectiveness of IRC decreases if the responding player is active IRC user and has several IRC-channels open or even several IRC-clients with several IRC-channels open, because there are many conversations going on and he or she might be following some other conversation when the important message arrives. Also non game related discussions in the clan IRC-channel can decrease channel effectiveness as some players stop following it.

Some online communities have formed static groups; the group is originally formed playing certain game and when the game ends, the group has decided to stay together and continue playing; they play new matches of same game or perhaps move to play another browser game. Big clan might have several games running in different servers and all the clan players are not playing in all of those. Players in clans usually have strict ranking and players have own responsibilities, for example certain player is responsible for informing other players and other player can be responsible for setting ambushes. Those responsibilities relate to the game and are formed based whatever is needed for the clan to be successful in the game.

Static player groups make the strategy games more difficult for beginners. Even the beginner starts the game from same point as everybody else, he or she might get confused when realizing that other player have formed alliances before the game has even started yet. Beginning of the game is essential point in many browser games and strong clan tries to ensure its territory. They can do it by destroying other players or just attacking continuously, which makes attacked players too weak to defend themselves and the clan members collect resources from defenceless player until he or she quits the game. Obviously, if first experience from a certain game is being forced to be resource field (farm) of other players or being destroyed in a few days, it is not best advertisement for the game and possibly the player will never try it again.

Clans might encounter problems when selecting the members. If a clan is formed based on player location in the game, the clan might get a lot of inactive players, which do not commit to the game enough. Clan accepting all the players, which want to join it, can grow quickly and appear to be a strong. However, it can be easily won by a smaller, but well organized clan with committed members. The well organized clan can act much faster and sometimes it might take real-time days before inactive players of big clan even notice being attacked.

In those Facebook applications that fill our definition of a browser game, the social community forms into the application page. Facebook itself is a social forum and there is no need to build separate pages for discussions, because application page is already a forum. Usually in this case, people appear with their own names, instead of aliases.

## 6. BROWSER GAME TECHNOLOGIES

There are several technologies to implement browser games. The game can run based on a web browser plugin, for example, Flash Player, Shockwave or Java. The games usually assist the player in downloading the correct plugin if it does not exist. The second possibility is to use server-side scripting, for example, PHP, ASP or Java (using jsp-pages). The server executes a script and responses to the client with a dynamic web page.

In [15] Häsel introduces two architectural choices for browser games, client-server architecture and Peer-to-Peer architecture. In client-server architecture, the serves keeps clients up to date, clients requests are delivered to the server, which responses and delivers data to the other clients. This can be problematic in real-time browser games as it generates lot of network traffic and the server must process requests of all clients.

In Peer-to-Peer architecture each peer has same responsibilities as every other peer. Instead sending actions to the server, each player communicates with each other player. It uses less bandwidth and can be more efficient than client-server architecture. However, effectiveness measuring of Peer-to-Peer architecture can be problematic. Some models for effectiveness measuring have been developed, for example [16] and even a special Peer-to-Peer networks to optimize effectiveness of certain tasks have been developed [17, 18]. Cheating can be also hard to avoid in Peer-to-Peer architectures, because every client has its own copy of the game state.

Nowadays many browser games contain good graphics and need more resources from the client and server than early text-based browser games. However, most of browser games are still played because those games have an interesting game idea and good playability. It has not been proven that browser games with good graphics would have great advantage in luring players. Although, a game with nice graphics is probably more attractive when the player sees it first time compared to, for example a game using almost only text interface.

In addition to graphic packages, there are lot of web plugins, which act as accessories in certain browser game. Those can reveal additional information for the player, for example Foxtrick [19] in Hattrick [3] reveals more information about player attributes than it is normally possible to see. Hattrick offers separate interface for web plugins, which those can use to collect data from Hattrick. Plugins can then present this data in various forms and diagrams. Players can set security code in their Hattrick account and when using web plugin, insert the same security code and this way, allow web plugin read privileges to their Hattrick account. With read privileges web plugins cannot harm the player account. Because of good support functionality, there are dozens of web plugins available for Hattrick.

Web plugins can also modify user interface, many web plugin modifies interface of Travian [2], in a different ways, for example add new button for sending troops faster than usual way. It is even possible to get sound signal from incoming attacks using web plugin. Some web plugins are even considered to be too useful for the player and offer unfair advantage, therefore there are web plugins, which use is prohibit. For example, crop finders, which can be used to find hexes with 9 or 15 crops (normally a hex has 4 or 5 crops), are banned from Travian.

## 7. FINANCIAL OPPORTUNITIES IN BROWSER GAMES

Advertising is very common in browser games. Although the game itself is almost never disturbed with pop-ups, banners are a common sight in browser games. The developer sells advertising space for companies and gains money when people see or click the banners. For example, Facebook advertises itself as possibility to reach exact audience and connect to real customers. Facebook also allows advertiser to track her or his advertisement progress in real-time and choose target audience by user's location, age, gender, education or other user information [20].

Extra features are also a common way of making money in browser games. Usually it is possible to buy some virtual currency unit with real money and this virtual currency can be used to buy extra features, units, or user interface shortcuts. In addition to extra features, Hattrick [3] also sells T-shirts and possibility to get important match events, for example, goals and player injuries by SMS messages directly to cell phone.

In The Continuum™ [21], the online collectible wargame from Seven Lights, the game is started with buying units with real money. Starter pack has 40 units and Booster pack has 15. Anyone can play for free, because they receive one booster pack at the registration and can play with them as long as he or she wants. However, new units can only be gain by buying new

starters or booster. This idea is originally used by collective card games and online versions of those, for example Magic: The Gathering [22].

Extra accounts can be sold to the players. For example, in Forumwarz [11] each player can create one account for free of charge. The second and third accounts can only be bought. Other two classes cannot be played without buying new accounts. The successful browser games or even the whole developer company can sometimes be sold to other company. For example, success of Club Penguin [23], led to that the developer company, New Horizon Interactive was sold to the Walt Disney Company in August 2007 for the sum of $350 million [24].

The players gain rarely any real money from playing the browser games. Even cash prizes are common feature of for example, Internet Poker, real world cash prizes are seldom used in browser games. However, Dark Orbit [10] offers real money prizes. Each month's winner gains a sum of several thousand Euros.

Sometimes possibility of gaining valuable virtual property encourages players to cheat other players. For example in Habbo Hotel [13] some players have stolen virtual goods from others and sold those to other players with real money. Players can also sell accounts for browser games, for example beginner might want to buy an experienced character instead of acquiring the experience for his character. Selling accounts to other players is usually prohibited in browser games.

## 8. RELATED WORK

There are some studies about browser games, which analyses player motivations, the players, and cheating in browser games.

Schultheiss [25] has studied long-term motivations to play MMOGs and found several reasons for people to play MMOGs. Most important factors, which lead to play researched browser game Space Merchant Realms [26] were competition, learning, integration of reality and escapism. The research also points out that there are certain group of core players and on the other hand a fluctuating group of players, who come to the game and do not remain a longer time. This can be explained by many reasons; one of those is the difficulty or dominance of the core players. To fix this problem, several games give beginners some advantage, for example, they cannot be attacked at the beginning, to ease this learning phase. Despite the beginning advantage, a complex browser games can be very difficult for beginners. Game start is usually very important moment of the game and critical mistakes at that point can ruin player's rest of the game. Core players are also looking for easy points or resources at beginners' expense. In addition, in browser games were players are divided into areas and players can only attack other players near him or her, core players might want to eliminate all players, which start the game in same area, just to eliminate the possible threat in the future.

Cheating is one of the main problems in all MMOGs, not only in browser games. In [27] Kabus et al. represent that retaining control over the global game state is necessary to avoid cheating and to lock out players without valid submission. This control retaining might make use of Peer-to-Peer architecture difficult.

## 9. CONCLUSIONS

Online and multiplayer are current trends in computer games and number of browser games is constantly growing. Browser games are usually lot smaller in size than traditional computer games; therefore development of those is faster. However, by developing browser games, it is usually hard to find financial opportunities, as there are no game packages to sell to the players. The profit must come from other sources, for example from additional features sold to the

players or from advertisement inside the games. Although this advertisement must be convenient, because disturbing advertisement might get some players to quit playing the game.

One main feature of many analyzed browser games was a huge virtual world with a lot of players. It is obvious that huge consistent virtual worlds are fascinating for the players as it ensures a lot of opponents and possible allies.

Online communities have always grown alongside browser games. Those online communities vary from forum users to well organized clans. Most popular browser games have spread over hundred countries, which all have national forums. Many Facebook browser games have also formed huge online communities, as those games can have fifteen million active users monthly and very active user communities.

The number of different browser games has grown in recent years and this development continues. Especially computer graphics used in browser games has improved in recent years. Browser games also vary more than before and it is possible that entirely new game types will appear in the near future. This hints that there still is lot of potential in browser games as new technologies and ideas come into practise.

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