GAME TESTING – AN ARENA FOR GAME CHANGERS (TESTERS)

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1   Game Industry

Gaming industry has been evolving for many decades ever since it started in 1947. We have great 30 years of video game history. The growth of video game is astonishing.   Many young people who read this might be surprised to hear that we are in 7th generation of video gaming. Let us traverse through these generations and explore what is in there for us. Like internet, idea of video gaming also originated in the military to improve the soldier's reflex in the battlefield.

The sales within the game industry are racing away. As you read this, somewhere concept of a new game is being created and sketched out. According to New York Times, console (XBOX, Wii and PS3) surpasses 200 million. On other side, there are 12 million subscribers who have joined online games and have been paying average of $15 dollar per month.

Please find the table below which summarizes the various factors that has evolved in the field of video games

	Last Decade PC MAN	Current Decade Virtual Tennis 4
Audiences	Affordable users Hardcore gamers	Hardcore games Children Women Seniors
Platform	PC Console	PC Console Browser Mobile Social network Tablet
Business model	Boxed sale CDs	CDs Downloads Installed on gaming devices

		Online
		Subscription
		Trial Access
		App Store
Style	Mostly single player	Single player
	Rarely multi player	Multi player
		Online across the globe
Device and Graphics	Traditional console game	Better graphics
	Little graphics	3D
		Interactive
		Simulate real world

2   An introduction to online games

One of the revolutions in the gaming industry is the big transformation of traditional single-player mode to multiplayer mode. Over last few years, the growth of online games is immense in the interactive entertainment market. In order to get clear picture on what is online games, it is important for us to understand the other patterns of gaming.
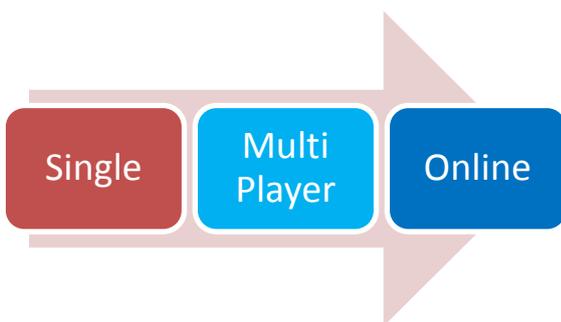
Single-Player mode: Everybody must have experienced this type of traditional pattern in which all input is expected from a single person throughout the game session.

Multi-Player mode: Most of us must have experienced this type of gaming in which two human gamers playing in the same environment. It offers gamers to join with other individuals to play as team or as opponents.

Online Mode: An online game connects two different players from different places to compete over the network. As speed of internet increases, the opportunity, demand and love of playing online games are also growing.

3   Challenges of game industry

This year 2012, the overall sales of video games have been fell short by 8% compared to 2011 sales. This could be the worst year since 2005. Everyone feels the biggest challenge is making new IP's because of its uncertainty and the risks involved. But that is what the end user expecting from the game. Industry became fatigue in genre and market fragmentation. Avid gamers bored of traditional way of playing game expect a new mechanics and fresh look and approach. As blue-ray generation consoles already started to ramp walk, industry need to take more risks with games otherwise there will be a huge market saturation.

U.S. Retail Video Game Industry 2005 - 2012
1H Only, Subdivided by Monthly Revenue
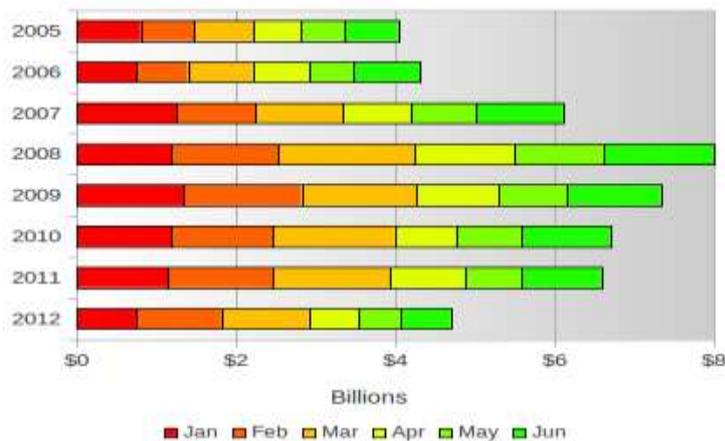
Though game industry blames the struggling economy for the downfall, there are some other challenges that prevent industry growth. Some of them are:-

S.No	Challenges	Impact	Recommendation
1	Piracy	Illegally downloaded games up 20% in five years Nintendo claims that they lost $975 million Call of Duty – Black Ops: No 1 game in top 10 most pirated games of all time. 4.27 million downloads No consoles are spared. PS3 is the latest victim	Release demo version Know your customer willingness to pay the price Encryption Implement Digital Rights Management
2	High development cost	Video consoles are triple the cost as compared to 6th generation Large portion of cost goes to paying the talent's making the games	Digital distribution Shut down game shops – No middle man Graphics alone is not a game

3	Lack of creativity	Guitar Hero, one of the hottest sequel, released 11 times in last 5 years In 2011, only 15 – 30% of games were new Gamers thinks twice if the title has 'Version' next to it	New ideas Shorter games Incorporate creative missions

(Table continued from previous page)

		Huge Licensing, royalty, marketing & distribution fees Difficult to convince people to buy high price for games	Always do not develop games behind newest technologies

4 Importance of Game Testing

The games are become more powerful, the video game industry needs testing tigers to make it a hit in the market. Launching new video game in the market costs millions of dollars.   Behind the scene, lies the skills of many people combined right from concept to final market. The video game tester is involved early and often in this process, ferreting out problems that arise along the way. The game tester must be part of the development team, as some bugs that arise can stop the process in its tracks until they're solved. The game tester helps find such fatal bugs early, so that others can fix the problems before they compound.

For example, Madden NFL 2008, a hugely popular game series had fans complaining about numerous bugs and even labelling it "unplayable" [source: ConsumerAffairs.com]. Hardware problems, such as the alleged crashing problem cited in a now settled lawsuit against Microsoft's Xbox 360, can also take a bite out of company profits [source: Todd Bishop's Microsoft Blog].

Fan feedback on the Internet can do irreparable damage to a company's brand. For these reasons, competent video game testing is crucial to game creators.

5 Challenges in testing online games

5.1 Is game testing a dream job?

People think that playing games are very easy. But in the background it takes a lot of effort of a game tester. The output that we are seeing on the screens is because of the strenuous efforts of the game tester. In fact playing games are fun filled. But the same cannot be said with respect to testing the same. Game testing requires some special skills that are essential such as passion to play games, enjoy the gaming environment etc. People are very fond of Nintendo games. But how many people know that the founder of Nintendo has never even played a single game using his very own device. So the passion for testing\using the game was not present in him. He was a good entrepreneur but the same cannot be said if people ask whether he is a good game tester.

5.2 Usability Testing

Two RTS games, WorldCraft III & Company of Heros have similar user interface (at the bottom)

We all know that gaming industry is rising faster. On other hand, it is well bounded by stiff and crowded competition. If the gamer does not understand the game at first look, probably he/she may not give it another shot. From the user perspective, they do not see how the game is made, what language being used or what database is used to store records? An end-user expecting a game to be easy to use, require less time to load and learn, feel the pleasure of real-gaming. One of the main focus of the usability in game testing is to pinpoint the challenges in the game that were not intended by the game developers.

5.3 Delay in transmission time or Latency: Lag
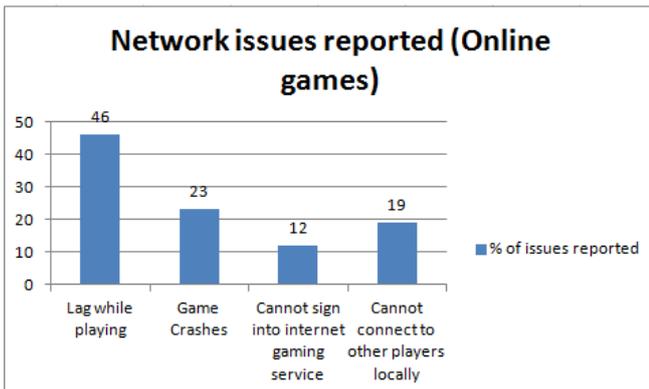
Network is the heart of online gaming which connects the two different players in a distributed environment. There is a study which states there is delay in 30 milliseconds within UK when players play within UK. For an example, if one player from India and another player from UK, there is an expected 300 milliseconds delay. Imagine a two player playing with the difference of 300 milliseconds, player who has better speed connection is more likely to win the game. This will frustrate the player, blame the game and probably recommend friends not to play the game. Imagine if the player uses wireless or GPRS to play online, the damage would be even worse.

5.4 Security Threats
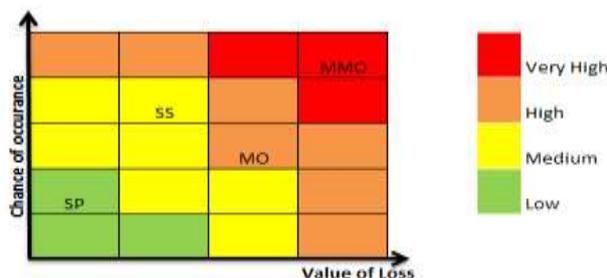
SP - Single Player / SS - Split screen play
MO - Multiplayer Online / MMO - Massive Multiplayer Online

Threats are common for anything that is being transmitted over network. Games are also one of the victims of hackers. In gaming industry various terms are being used to define the security threats. Some call it as hack (remotely break into other's system), some call it as exploit (take advantage of game vulnerabilities and glitches), cheat (playing unfair) and attacks. But all these threats are simply defined as cheats in

gaming industry. Gaming developers often include cheats in their game as an additional feature. Do you remember using cheats in Price of Persia where you can be invisible and to go to the next level? In single-mode player it was not a problem, but in online game it becomes a security threat. In 1997, 35% of online game is cheated. One of the popular Massive Multiplayer Online Role Playing Game such as Ever Quest has been reported to reap more than $50 million a year in revenue some of the actions considered as cheating as follows:

- Modifying game data through compromised game servers
- Breaching authentication
- Lack of secrecy
- Cheating by collusion
- Misbehaviour
- Denial of server to peer players

6 Approaches to overcome testing challenges

6.1 Qualities of game tester

What makes a good game tester? Game testing is one of the niche areas where it requires some special skill.

What is ideally required in a game tester?

- Passion
- Experience
- Dedication
- Patience

Passion:

Video game testers should have a passion for their work. Not all video game testing is glamorous and some of it isn't even fun. For this reason, it will help greatly if the individual has a love of gaming that can help them to keep their eye on their goal. The long, tedious hours of game play are another aspect of video game testing that can only be endured by the player who really loves, or at least likes the game. Individuals who have no real affinity for video games would be very unhappy in this field.

Experience:

Is experience in game testing required? Many people believe that game testers should be experienced in testing the games. But in reality that is not the case. The lesser you know about a game, the more chances that you might find some glitches. One of the tasks of game testers is to play the game the way
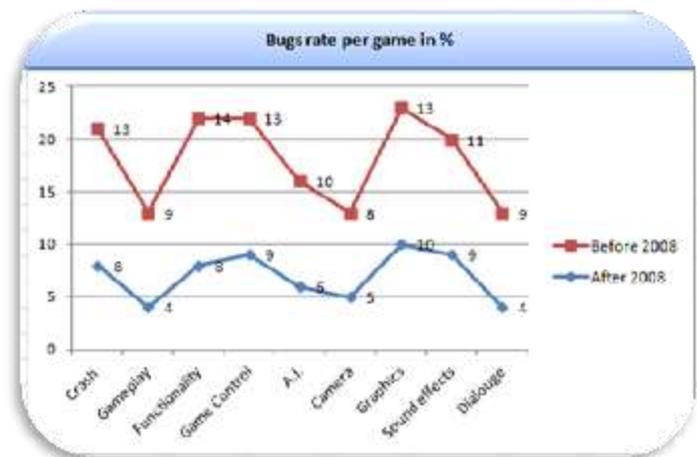
a new player would, making the same mistakes they might make and thus discovering bugs in game play.

Dedication:

One of the most important aspects of a game tester is the amount of dedication that he shows on the job. Even though game testers are required on a case to case basis and that too not very frequently the dedication of the game tester to test games should always be on the high end.

Patience:

Some video game testing assignments may consist of tedious tasks such as turning the system on and off multiple times or downloading movies during game play while watching for the system to freeze. Even assignments that are cantered on game play will encounter frequent glitches causing the game to freeze or crash. It is the game tester's job to discover these problems, but it can be frustrating when you are enjoying the flow of the game. Patience is an essential skill for video game testers.

6.2 Standard Vs. Game usability testing

Standard software or game, both shares a common mission that is … it should be usable. Some of us may come to conclusion to that usability checklist that we maintain for standard software is also applicable for game. Before we start to prepare the checklist or test cases targeting usability, we testers should understand the fundamental difference between these two.

Know your user	When testing, know your user. Who is the user of Angry birds? Who uses Photoshop?
Consistency	In regular application, features and options are found in the same place and tasks are completed in the same manner every time There was an issue for many users with the transition from office 2003 to Office 2007 In contrast, games should provide a variety of experiences and mechanisms so that a player's interest is kept.
Function vs. Mood	Do you make sure your 5.1 surround sound is

	setup when you open an excel spread sheet?
Ease of use	In regular application, users expect to complete his task very easily. Imagine a game in which you toss the ball and hit it. At the end of few trials, you win. It is super usable game. But very boring. End user expecting challenging game.

Some of the user interface tests are consistency, customizability (game speed), AI (difficulty in path finding), view mismatch (camera angles), input (limited device support), controls (unresponsive controls), game status, training mode and visual representation.

Usability Types

Game industry is practising some of the best approaches to overcome usability issues in the game:-

Usability Types	Description
Heuristics Analysis	Expert evaluates the game aspects with respect to game mechanics, game difficult and overall enjoyment
Focus Group	Focus groups are really only useful in the prototyping or idea generation phases
Real User Testing	Real user is the best tool to bring out the minute issues

Case Study for Usability:

Name of the Game	Halo	Combat Flight Simulator
Indent of the game	Soldier characters must fight in the battlefield with variety of weapons. Designers wanted 'Close quarters combat' feel in the game	Moke-up menu interface tested by testers
Problem Statement	Novice users started fight with enemies from the longer distance and easily move on to next level. Users were choosing only one type of weapon throughout the game	Moke-up did not represent what the final menu looks like. Testers has difficulty in finding what 'AI' means in the menu and were unclear about how Low, Medium, High related to AI
Usability Approach	Heuristic	Focus Group
Solution	Changes to interface and enemy AI resolved these issues	The main text was changed to Enemy Level and options are changed to Rookie, Veteran, Ace

6.3 Testing Lag issues in online games

Initially distributed testing was used to test online games. Players sitting at different locations and test the online game. This testing has limitation that we can't see what bandwidth they are using and we have no control over it.

The best way to test latency and delay is to setting up of real network environment. One way to test online game network issues is to have game tester under the same roof. The problem with this approach is all going to have same bandwidth experience. We don't get the experience of one person playing in Germany, one playing in India and one playing in England. So we can't see how latency is affecting the game.

How do we implement this? The best answer to create such network in our lab that behaves like real network - this type of network called an emulated network. With the help of emulator we can set up different bandwidth for different testers so that a game can be tested as like real users sitting in their home and experiencing game. You can test this with different bandwidth using emulator is like using flight simulator.

In flight simulator you can incorporate any scenarios like bad weather conditions, bad climate and test how pilot can actually cope with that situation. Similarly using network emulator you push the boundaries of game and verify when it becomes completely unplayable. You can actually get the guidelines with this approach and circulate the minimum network specification required to ensure a good online experience.

Also you can test the alert messages related to network issues to ensure that any performance loss is not down to the software due to the network.

Network gaming is projected to grow at 21 % every year between 2009 and 2015. 44% of video games in 2010 are networking gaming.

6.4 Few approaches to test against the cheat issues

Cheats	Description	Testing Techniques
Tests for cheaters who violate game or denying service to peer	Disconnecting when player about to lose Disturb peer and let to play their games	Game mechanics have already been implemented to fix this issue. Tests needs to performed around fix to ensure player lose ratings if he does not finish the game as per the procedures.
Exploiting misplaced trust or cheating by exploiting client-server infrastructure	Cheaters modify the game configuration, data	It is important for the testers verify the two-way authentication between game server and client to verify that both client and server are genuine

		It is also important to re-authenticate when a player re-joins the game after session is expired.
Cheating by collusion or Game Specific Cheats	Verify chat logs, Testing game logs, chat logs and audit trail	Gamer tag is a persistent ID, like a user name, that a gamer uses across all Xbox Live games and applications

Case Study – Against Cheats

Case Study 1: Win Trading is a popular term among competitive online games. In general, players battle each other to gain rating. To cheat on this, two players agree to take turn in winning, to progress faster in ratings. Though there are players available online to play, the player who agreed themselves continue to compete to go up in ranking. This was popular in the game StarCraft 1. The fix was suggested by group tester for this to bring down the rating of player who loses the game. Game mechanics designed in such a way that player gain the most points by defeating a player who is greater in ranking.

Case Study 2: In online game, time and state are two most important. Sometimes cheating players deliberately slow their own moves to monitor their opponent moves and thus gain a huge advantage. One of the popular time cheating is 'Sniping' auctions. In an auction game, player can either bid on or directly buy it for fixed price set by the seller. Now cheaters can try to bid on such an item right before the auction expires, effectively snipping it away from the player who thought he was going to win it.

Fix was suggested by QA in world of WarCraft, hence developers increase the time left on an auction by five minutes every time a new bid is placed.

7 Conclusion – Future of game testing

In terms of money value: DFC intelligence has predicted that the global revenue of video game will grow from $50 billion from 2011 to $70 billion in 2017.

Audiences: Few years back the average age of core gamer is between 18 to 30. But today technology and game design will exceeds this average age till 40's in coming years.

The future of video game testing looks promising for QA as future of video game is expected to be huge in coming years. The foremost change would be usage of hardware. We already started to build games that simulate humans. In the future, it is going to be even more interactive and can generate real dialogue based on the game situation rather than pre-recorded dialogues. Input devices and more accessories are going to be developed to make the game more interesting.

 Game testing going to even more complex and challenging because of the variety of different components of the game.   People already started seeing game industry as one of the powerful career path. Like automation tools have been taught in the training centres, game testing will also be taught with tools and techniques. Play testing will become one of the best practices in the industry.

In play testing, group of testers will be playing the game for hours, while they doing this set of testers will observe the play style and record the behaviour of testers. At the end of the testing, questionnaire will be given to testers to provide their feedback. This basically helps to determine three types of data bugs, feedback and glitches.

Whether we're play testing internally or bringing people in, there's nothing like listening and reacting to people that is passionate about what we're doing and it helps us make some of the best games in the industry.

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Indium Software is exclusively focused independent software testing services firm since 1999. Over the years, Indium mastered objective methods that minimize the risk of failure of applications and software products. With a global headcount of over 300 employees, Indium works for a mix of marquee Enterprise and ISV clients spread across the globe. Indium is aggressively pursuing the Social, Mobile & Cloud agenda to make these the core of our next wave of service specialization.

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