

Business white paper

Knowing your game

How electronic game companies use Big Data for retention and monetization



Introduction

A recent Boston Globe business article describes 23 year old Steve Serge as a star. Not just because “STAR” is the player name he uses during his online gaming sessions, but also because he’s a celebrity—with hundreds of thousands of fans watching him play live on Twitch.tv, or watching his recorded Team Fortress 2 sessions.¹ In the rapidly growing and evolving world of online gaming, there are many more like him, ace gamers with the kind of skill that attracts attention from all over world.

It shouldn’t surprise us that online games have become a spectator sport. Like all forms of game—from football, to poker, to chess—the entertainment afforded by electronic gaming begins at an individual level, frequently expands to team participation, and, as appreciation grows for the skills involved, a game can attract hordes of people who just want to watch. One name for this aspect of electronic gaming is “eSports.” In October 2013, the Staples Center in Los Angeles sold out within one hour for the popular online game “League of Legends” finals. Move over, LA Lakers.

How big has the electronic game industry² become? Gartner Group estimates the combined mobile and PC-based game industry will grow to more than \$43 billion USD by 2015. Add to that another \$68 billion USD for console (Wii, etc.) and handheld video, and Gartner’s market size estimate shoots north of \$110 billion USD. While console-based video games will still dominate, the mobile device gaming market is growing fastest, nearly doubling in size during the three years Gartner has kept track.³ Let’s put this market size in perspective with three other very well-established entertainment sectors. In 2012, the worldwide film industry grossed under \$35 billion USD at the box office;⁴ the global sports market—including live venue and broadcast, merchandising, and sponsorship—is estimated at \$145 billion USD by 2015;⁵ and the worldwide haul for pay TV services in 2013. Around \$153 billion USD.⁶

No wonder companies are competing fiercely in the electronic gaming arena. In less than two decades of growth, revenues are rivaling traditional forms of entertainment. Game designers, developers, publishers, and platform providers are weaving visual arts, computer science, sound engineering, ergonomics, and more into innovative, compelling new ways to attract gamers’ attention and wallet-share. Advertisers are eager for banner space in the margins, and gaming publications like *Edge*, *Gamasutra*, and *Joystiq* are guiding gamers with editorial content, game reviews, and, yes, more ads.

With this much popularity and online activity, the gaming industry offers a rewarding new space for Big Data analysis. Moreover, Big Data in the gaming industry offers a clear view into click-stream and customer behavior analytics that can apply broadly to almost any business that provides consumers an online presence. This paper provides an overview of how game developers are using Big Data analytics to improve their electronic games and differentiate their offerings from the competition. We describe how analytics helps companies monetize their games, and we introduce the capabilities of the HP Vertica platform by showcasing three HP customers who rely on this technology as a key part of their business model.

¹ bostonglobe.com/business/2014/03/06/hardcore-gamers-put-show/loV4nVggeGWnBsKfwVmtRP/story.html

² This paper describes the electronic game industry; while there is certainly overlap in concepts and technical underpinnings with online gambling, that topic is beyond the scope of this paper.

³ gartner.com/newsroom/id/2614915

⁴ en.wikipedia.org/wiki/Film_industry

⁵ pwc.com/gx/en/hospitality-leisure/changing-the-game-outlook-for-the-global-sports-market-to-2015.jhtml

⁶ international-television.org/tv_market_data/world-tv-market-2010.html



Making money: Changes on the electronic gaming landscape

True, not all game developers set out to make money. Some small-shop developers want to make a game available online, simply to create a reputation and, of course, have fun in the process. For the purposes of this paper, however, we will focus on companies who choose to monetize (make money on) one or more aspects of their electronic games within a viable business model.

The way to monetize in the game industry has changed dramatically over the past few decades. Think back a few years. Nintendo's once wildly popular Game Boy launched in 1989, sold out immediately, and became the most successful video game of its kind. But this was prior to widespread use of the Internet. Without an online component, manufacturers of standalone hand-held devices, like Game Boy, or computer-based games like Myst, simply worked to make games intriguing as the primary way to ensure sales, relying on the creation of new versions or new IPs (new games) to keep users coming back for more. Needless to say, the Web changed everything in the field of electronic gaming, as did rapidly improving and increasingly affordable graphics and connection speeds. Two-dimensional sprite characters (remember early Mario Brothers?) gave way to 3D perspective and life-like avatars, which you could create yourself and use to interact with others in a virtual world.

This Web- and graphics-charged landscape became the playground (battleground, in many cases) for a new wave of gaming. The stability of e-commerce merged with the allure and variety of available games, and new ways to monetize developed, seemingly, overnight. For example, online games could be free-to-play, but they might be designed with incentives to actually purchase certain "goods"—a better weapon, a new tract of virtual land, a hint—as part of the game play. This capability to pause the game, or not, while a virtual character engages the real-world in a monetary transaction represents one lucrative means for game developers and publishers to stay in the black. And there are many others.

The game value chain

Let's consider game monetization in terms of four fundamental links in the "game value chain." These interdependent links, or phases, ultimately determine the success of a game and help define the viability of the game developer's business model:

- Idea
- Balance
- Goods/Currency
- Payments

Idea: At the very top of this chain is the game idea itself. This is the fundamental building block of everything that follows. Developers with a game idea will first evaluate the revenue potential of the game. Can it gain stickiness? Does it serve a niche audience? Does this audience already enjoy some offering from a competitor? If so, what can we do to move things to our advantage, and monetize that change?

Balance: Once a game idea itself has been fleshed out, the next phase is game balancing. This is where developers begin defining crucial monetization factors. Virtual economies function just like real-world economies, with supply and demand, inflation, etc., and these must be factored into a pricing structure that will remain balanced and fair within the game, provide developers with a decent return for their efforts, and remain attractive to the end user, i.e., cost vs. value. In addition to these variables, developers must also factor in limited offers and promotions that will incentivize users to either play or purchase more, while at the same time, maintaining the delicate balance of their virtual economy.

Goods/Currency: Once the developer sets pricing points, the next step is to invent a way for users to make purchases within the game. This is where virtual currencies might make their appearance in the context of the game. As with real-world transactions, players must have access to some form of currency that can be then used to purchase items. Developers must determine specific purchase prices of the various virtual goods/items to be sold within the game, based on the perceived worth of the goods being offered.

Payments: At this phase of the value chain, developers are essentially done with the “virtual” part of the business, and now have to build the bridge to “real-world” money. Payments can either come from a separate company providing an offer or service, or directly from the end user themselves. When game developers choose to receive payment directly, there are a number of real-world financial considerations, including credit card fraud, charge backs, taxation, and more. If they choose a service provider to handle this for them so that they may continue development on their product and not get hung up in economic red-tape, do they want a branded or white label payment service?

The (multiplayer) role for Big Data

Just as high-speed Internet connectivity and advanced graphics introduced a sea-change in the electronic gaming industry, consumer analytics is proving to be another disruptor in terms of competitive differentiation. How?

Generally speaking, the more developers know what features interest their users—whether they are game players, online shoppers, airline travelers, etc.—the more they can enhance those features and potentially attract higher usage. Developers want to know which features users click on, what goods they buy, what inspires them to invite other users, etc. Game developers typically want to know other things as well, such as player classes, how many playing the game are archers, sword wielders, or magic casters? and what virtual areas are most inhabited? Developers also need to know where things are going wrong, such as players getting stuck in some area of the game. The data that supports this kind of insight is the result of what’s called “game telemetry.”

Game telemetry has become the new buzz word within the game industry. Telemetry data is obtained and utilized across numerous game genres, from social games like Farmville to first person shooters like Call of Duty to multiplayer games like Grand Theft Auto. It is scrutinized by game user researchers, usability engineers, and user analysts in game companies. The problem is knowing what data to collect, then analyzing and reporting it correctly and efficiently. Another problem has to do with data volume: so much data gets collected, it can take an inordinate amount of time to sort through it in a way that becomes useful. Consider the math. If you have telemetry in place for tracking every in-game event of every user for every game session, the numbers add up very quickly: 1 million daily active users (DAU) x 1,000 events collected on average per user, assuming 150 Gigabytes in total per day equates to greater than 4 TB per month. Retaining that data for 12 months means we’re at nearly 50 TB for a year per IP!

Running queries, and obtaining useful results, on this much data can be prohibitive with a conventional database. This is why gaming companies who are serious about Big Data analytics are turning to faster, columnar databases, like the HP Vertica Analytics platform. Queries need to be answered in seconds or minutes, not hours or days.

But why so fast? And what kinds of queries? What kinds of information can an analyst find in 50 TB of data, or more, that can support higher monetization?

Near real-time A/B testing: Knowing the relative popularity of two versions or features of any application you provide (that is, A vs. B, or previous version vs. new version), including a game, can be critical. That knowledge can spell the difference between your creative project going viral vs. one that is tried once and set aside. Ideally, you’re able to test in near real-time to see what drives favorable outcomes. Many companies are able to load large amounts of data while allowing users and analysts to query at the same time. This allows for rapid improvement of the application and helps drive monetization. Developers don’t want to wait say 24 hours to get the results of something they tried yesterday. They want to be able to link up exactly what they did to what set of users with certain outcomes in mind that they wish to achieve, and they want to do this instantly, or as quickly as possible.

Virality: The concept of a song, a video clip, or a game “going viral” actually has a basis in disease studies, the details of which are beyond the scope of this discussion. The basic idea is fairly simple: Game enthusiasts (“active hosts,” in disease terms) will invite members of their social network to participate in a game. These invitees (the newly “infected”) will play the game for some measurable duration. So the factors in measuring virality are frequency and number of invitations, and duration of play among the invitees. The longer this duration, the more likely these invitees will become themselves “active hosts,” thus the analogy to a real virus.

Big Data analysis of these factors help game designers address four viral objectives:

1. Increase the percentage of “active hosts” who actively make contact with people
2. Increase the contact rate for each active host (average number of contacts per time period)
3. Increase the duration of each active host’s infectious time period
4. Increase the likelihood that contacts turn into infections (i.e., infection conversion)

Retention: Retention, otherwise known as “stickiness,” refers to an application’s capacity to attract users and drive profits. It’s the same for the electronic gaming industry: It’s all about a game’s capacity for attracting and retaining players over some defined, profitable duration. Tracking retention is important for any social gaming business: knowing your retention rates can help improve virality as well as predict the overall sustainability (long term success) of a game. One simple metric is the ratio of DAU to monthly active users (MAU). For example, a DAU/MAU ratio of 50 percent means that, on average, players are engaging a game 15 out of 30 days per month.

Of course, many industries—from banking, to gardening, to athletic equipment supply—can benefit from the same sort of retention capacity that gaming companies measure success by. In terms of virality, described above, the ability to measure a user’s frequency of return will give you a better understanding of where you need to improve in order to increase the number of people who learn about your services. If rates are on the low end, not only can you work to improve them overall, but you will also learn when in the engagement timeline you should try new distribution strategies to get users to invite more people.

There are many other ways to take advantage of retention information. For example, if you know the customer lifecycle of your game or application (i.e., the days, weeks, or months between when individuals start and stop playing your game, or accessing your app), you can use that information to determine how long you have before you should launch a new product. Many gaming marketers know exactly how long their customer lifecycles are and make sure to cross-promote a new game before the customers are completely done with the first one. This gives them a chance to push their existing user base onto the newer game before they stop playing completely.

Here are the seven major drivers of retention in the gaming industry, all of which apply to other industries based on app download and usage as well. Big Data analysis helps determine how changes made to each of these drivers actually delivered the desired outcome.

1. Motivate people using stimulus/reward
2. Give rewards at random intervals
3. Slow down rewards as time goes on
4. Eliminate clear stopping points
5. Incorporate fear of loss if you stop
6. Motivate collecting and hoarding
7. Provide a sense of accomplishment

Introducing HP Vertica, powering the HP HAVEn Big Data platform for blazing-fast analytics at extreme scale

The secret behind gaming success is not only the ability to understand players' needs, behaviors, and usage patterns, but to respond to these things quickly. The HP Vertica Analytics platform enables companies to analyze at extreme scale—in near real-time—massive volumes of game usage data around the clock, which helps quants (analytics teams) gain insights previously unattainable. HP Vertica is a massively scalable, columnar database, custom-built for real-time analytics on petabyte-size datasets. It supports standard SQL- and R-based analytics, and it supports all leading BI and ETL vendors. Along with Apache Hadoop, HP Autonomy, and HP ArcSight Logger, HP Vertica is part of the HP HAVEn platform for Big Data, which encompasses hardware, software, services, and business transformation consulting.⁷

Fast analysis of acquired data means that developers can more quickly see how users interact with their apps, websites, and games, how they respond to new features and promotions, which in turn allows development teams to more effectively design and redesign their offerings. For gaming companies, it helps developers more quickly monetize elements of the game.

With the ability to make informed decisions with unparalleled efficiency, performance, and scalability, HP Vertica customers and partners routinely address the following challenges:

- Mine user behaviors and social networks for effective game development and monetization
- Create a scalable data collection solution with event based processing and behavioral analysis
- Load vast amounts of data while concurrently querying for in-workflow decisioning
- Develop solutions that create simplicity for analysts versus technologists—analytics everywhere



⁷You can learn more about the HP HAVEn platform for Big Data [here](#).

Game on: HP customers put analytics to the test

HP Vertica electronic gaming customers are using Big Data analytics to their competitive advantage. We invite you to read how our customers in three different sectors of this industry are using HP Vertica to help them retain and grow their customer base, and maintain leadership in today's highly volatile digital gaming market.

GSN Games

GSN Games is a leading provider of cross-platform entertainment, including social casino games and cash tournaments on its social, mobile, and Web-based gaming platforms. Thriving in the fast-paced online game development world, GSN Games develops dozens of new titles per year and pushes out five incremental releases per week. The HP Vertica Analytics platform is central to GSN Games' business, including the company's ability to push new game features out to small test markets, and deploy these features to a larger audience in near real-time, depending on player feedback. GSN has seen explosive growth over the past two years, with 77 million subscribers to their TV network and online game sites, plus 110 million registered game players across Facebook, Web, and mobile apps. Read the case study [here](#).

Supercell

Since Supercell began developing games for tablets in 2011, the Finnish company has had two top-grossing games for the iOS platform, "Clash of Clans" and "Hay Day," both released in 2012. Supercell has now expanded from the iOS platform to the Android platform, increasing the amount of data it ingests to approximately three to four terabytes of data per day. Behind the scenes, Supercell has adopted the HP Vertica Analytics platform for gaming data analytics. With HP Vertica, Supercell has an analytics platform and partner to support its tremendous growth. Read the case study [here](#).

Spil Games

For Spil Games, a global leader in online casual and social gaming, website engagement and customer retention are critical business metrics. The company therefore implemented the HP Vertica Analytics platform. As a result, Spil Games can now capture and leverage the enormous amounts of data generated by the 180 million people that visit its websites every month, which in turn allows the company to drive business innovation and improve its ability to serve compelling gaming experiences to its customers. Read the case study [here](#).



Conclusion

The electronic gaming space represents one of the more recent areas where rapid data collection and analysis is providing competitive differentiation. Before Big Data analytics, electronic game development was done purely on instinct and guesswork; game popularity grew largely by word of mouth. Now, game enthusiasts invite members of their social networks to join the play, and companies with sound analytic capabilities can watch as network traffic increases and, potentially, their games go viral. Gaming companies use HP Vertica to analyze their game session data on a deeper level and enhance gaming experiences in real-time. Others use analytics to make their games more fair to all players—preventing, for example, some players from running combat macros in the background to get experience points, but not actually playing the game. How your team will use HP Vertica for better differentiation from your competitors, more successful monetization, and making your games more irresistible is entirely up to your imagination.

With some of the fastest load time and query results available for columnar database design, HP Vertica is uniquely suited to the demands of the gaming industry, which is why so many companies are using HP Vertica in this rapidly evolving space.

Selected additional reading

- [Introducing the HP HAVEn platform for Big Data](#)
- [The HP Vertica Analytics platform](#)
- [“Gartner says worldwide video game market to total \\$93 billion in 2013”](#)
- [Gameanalytics.com—gaming blog](#)
- [“How we use Vertica at GSN,”](#) entertaining blog entry by Portman Wills, BI & Analytics team lead at GSN Digital

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