CLOUD COMPUTING…NOT YET FULLY BAKED

PROCEED WITH CAUTION. UNDERSTAND THE TRADE-OFFS. SEPARATE FACT FROM FICTION.

"Cloud IaaS is not magical. It does not convey automatic application scalability or availability; applications must be designed to scale horizontally and to be resilient to failure and performance fluctuations. The availability of infrastructure on demand does not eliminate the need to capacity-plan for budgeting purposes."

- Gartner, Inc. in "What Managers Need to Know About Amazon EC2", Lydia Leong, 15 March 2012.

"However, this race for mindshare has obscured cloud computing facts. Many admit to the haze surrounding cloud computing."

- HP Business White Paper: "Five Myths of Cloud Computing," May 2011.

Having direct experience in delivering the first U.S. Internet gaming solution via a cloud-type environment and being equipped with GTECH's SilverLining Cloud solution, the Company's extensive business case analysis has produced a cloud strategy that carefully balances risks and rewards. In the following article, GTECH's Chief Innovation Officer, Don Stanford, highlights some of the major considerations associated with a lottery migration to cloud computing.

Don Stanford, recently named GTECH's Chief Innovation Officer, began working for GTECH's founders in 1979 as a Manager of Software Development. With more than 30 years of experience in the lottery industry, Don guided the growth of GTECH's technology organization from a software staff of four to a worldwide deployment of more than 1,000 technology professionals. Under Don's leadership, GTECH advanced in terms of both transaction processing and wireless communications, which enabled the Company to lead the lottery industry in worldwide growth and the installation of systems on six continents. He has held every technical leadership position, including Director of Software and Systems, Vice President of Advanced Development, and Chief Technology Officer. Stanford also served on the GTECH Board from 1986 until 1989 and helped GTECH achieve 15 unique patents.

Don earned a B.A. in international relations and an M.S. in computer science/applied mathematics from Brown University. He serves on several boards, including Times Squared Academy Charter School, Spectra Systems, and the Business Innovation Factory, and is a member of the Rhode Island Science and Technology Advisory Council. In 2001, Don was appointed Adjunct Professor of Computer Science at Brown University and has been teaching undergraduate courses since 2002. He is also an Adjunct in the Graduate School of Engineering and an instructor for the Program in Innovation, Management, and Entrepreneurship (PRIME).

Don's wealth of experience within the technology industry and consistent passion for innovation will play a key role in his new role as Chief Innovation Officer.

Over the last two years, "Cloud Computing" has dominated the marketing and messaging in Information Technology (IT). At its core, it is the implementation of a simple concept:

Take advantage of advances in computing, software, and operations to deliver more value for less investment and ongoing operating cost savings by sharing and on-demand provisioning of assets that no longer need to be dedicated to a single purpose or application.

Those of us who have been involved in computing since the 1960s will recognize this as the 21st century manifestation of "timesharing," where many users shared the limited resources available on the large expensive mainframes of the time, thereby making computing more affordable for all users.

The actual definition of Cloud Computing is still evolving. New terminologies to describe Cloud's various facets and potential seem to spring up almost weekly, many of which are invented by industry giants as each one vies for industry and customer mindshare.

Public Cloud infrastructures hold great appeal for many internal IT applications as well as e-commerce. If you were setting up a new entrepreneurial e-business today, you would not have to look any further than Amazon or a host of other providers to supply you with everything you need to launch your enterprise on the Internet in a matter of days by sharing services that they have waiting to host and power your business or enterprise. This allows customers to use their working capital for marketing and business development instead of provisioning hardware and licensed software. The benefits of Cloud services for these computing and Web-based applications are obvious as witnessed by the legions of customers using Amazon EC2, Google Apps, and Salesforce.com cloud-based services.

BEWARE OF THE HYPE

If, however, your business cannot tolerate interruptions or disruptions that affect system availability or data integrity under any circumstances, the ability of Cloud to deliver at that service level becomes less clear and ultimately requires a more in depth analysis of the risk/reward equation. Behind all of the potential and hype that floods the IT media about Cloud, there are still fundamental concerns around the ability to manage risk and system integrity in order to preserve mission-critical applications. For this reason, you will not see applications that involve public safety, essential services (such as power grid and air traffic control), or large liabilities hosted on Public Clouds anytime soon.

The implementation of Cloud in lottery services requires a careful analysis with a conservative eye toward managing and mitigating the obvious risks. It's very tempting to squeeze a lot of services and infrastructure into the smallest possible package and cost structure, but it carries the risk of a single failure or malicious attack bringing the entire enterprise down at great financial and reputational harm. Considering that billions of lottery transactions are processed worldwide each year, with commensurate jackpots in the hundreds of millions of dollars, it would be foolish in the extreme to entrust any of the core computing assets to be exposed to additional risks that would be imposed by operating in a Public Cloud.

"Cloud computing has changed the nature of collaboration, content-sharing, document storage, and project management to enable more efficient, faster-acting, and cost-effective enterprises…"

That is exactly how Application Service Providers (ASPs) were described a decade ago.

MAINTAINING CUSTOMER TRUST

As we explore ways to employ best practices for Cloud infrastructures, we must be realistic about those cases where the benefits are justifiable and conversely those that are not given the importance that we attach to our public gaming businesses. Recent discussions with several of the leading Cloud service providers indicate that they have limited ability to provide guaranteed service levels that are consistent with the expectations of the lottery industry, and it would be a step backward to lower the performance and security bar in order to justify the use of Cloud.

It is critical to understand that there are many different types of Cloud solutions. The right solution strikes a delicate balance between increased efficiencies and risks to data integrity, as sensitive IP and customer information are exposed outside the control of private operations. This is a significant consideration for European lotteries as EU regulations are lifting the constraints for in-country data centers, thereby increasing the likelihood that more lotteries in Europe will consider adopting cloud strategies.

RESPONSIBLE PROGRESSION

Lotteries around the world are being presented with sales and marketing messaging from cloud solution providers that offer promises of plug and play lottery services: immediate game catalogues, rapid system deployment, and full solution management.

Current GTECH technology can have a lottery system up and running within 90 days with a fully functioning game library. In fact, we just launched Internet wagering in Illinois in four months. So the question is: Why cloud? What does cloud technology deliver that is not an option in current lottery solutions?

For businesses that are interconnected and share identical product processing procedures, public cloud solutions have the potential to reduce costs and increase efficiencies, without a doubt. But the Texas Lottery is not the Française des Jeux Lottery. The Massachusetts Lottery is not the Dansk Spiel Lottery. Customization is the cornerstone of success for each lottery, as player game preferences and regulator standards are unique to each jurisdiction. One size simply does not fit all. There is a high cost connected to relinquishing control of system design.

As shown in the graphic below, in a multi-tenant environment, the more you outsource the more potential exposure you face and the less direct operational control you have over the environment as shared services increase. What this really means is that any malicious intent directed at a co-share customer affects the aggregate data of all share customers.

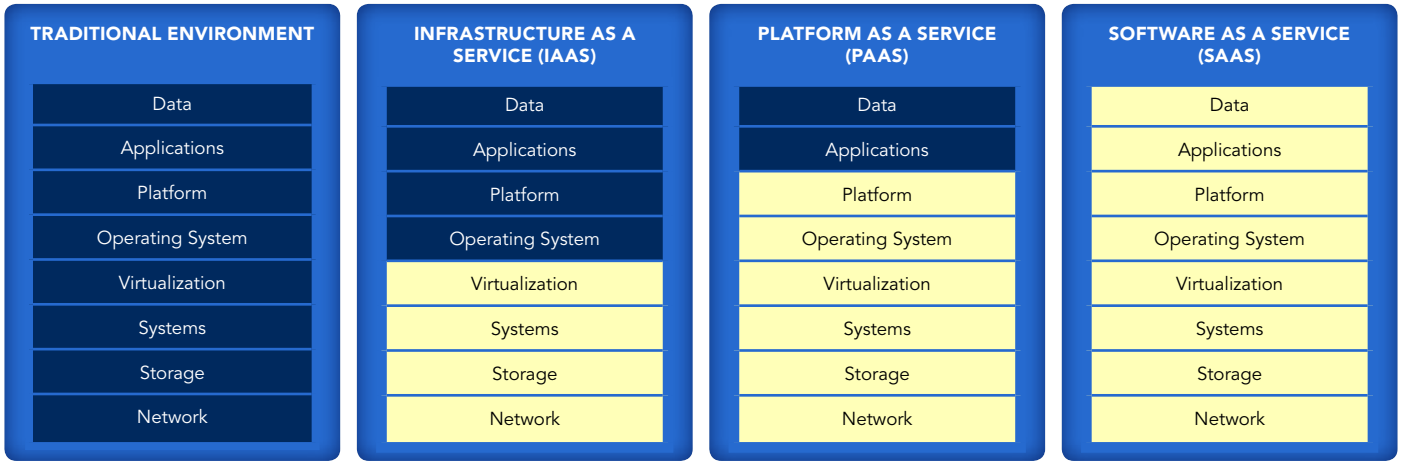
As Cloud services increase (depicted by yellow coloring)

threats to critical data exponentially increase.

- Infrastructure as a Service (IaaS) is a cloud service model offering fundamental computing resources as a service.
- Platform as a Service (PaaS) is a cloud service model offering a software platform solution stack as a service.
- Software as a Service (SaaS) is a cloud service model offering software applications as a service.

Our industry will require a special application of Cloud when and where it meets our business requirements without compromising the service levels to which we have become accustomed. This will entail the development and deployment of Private Clouds (as opposed to Public Clouds) that specifically address our concerns and needs. Certain applications suggest themselves by virtue of their lower-risk profile. Development and test environments have long benefited from various forms of virtualization and resource sharing and are prime candidates for Cloud implementations.

Likewise, services that supplement the core transaction applications but have no direct impact on sales or transaction security can be considered. The ability for U.S. customers to now access Internet and mobile channels, as is currently the case internationally, will also result in certain gateway services implemented in shared Private Clouds.



PRIVATE CLOUD CONSIDERATIONS

Virtualization is one of the significant mile-markers on the cloud technology roadway and in fact, virtualized systems have been supporting lottery systems for years. Recognition of the advantages of virtualization and shared services was the impetus for creating the solutions managed by GTECH's Data Center of the Americas, which services both domestic and international customers. Our current customer Cloud solution, SilverLining, is GTECH's Enterprise private cloud initiative that marries the traditional lottery requirements of reliability and security with new interactive channel processing while respecting the essential need for customization in lottery system design. Our latest addition to our product portfolio, GTECH's Player Direct service, is based on shared infrastructure and software components as is our newly deployed Universal Mobile/Internet Gateway.

Many of our development and test environments have used Private Cloud concepts for years since private Cloud based solutions allow for quicker scalability and quicker time to market as hardware, software, environmental, and facility assets are shared.

The ability to respond to new technologies and alternate business models is essential in order to survive in our IT-demanding world. That is one reason why lottery transaction processing systems are now hosted on dedicated but shared and distributed servers. This is, however, distinctly different from sharing and outsourcing on publicly hosted systems, which are the greater part of Cloud methodology today as exemplified by Public Clouds.

When considering Cloud solutions for our public lottery services, the following questions must be answered:

- How much control are we willing to give up?
- What performance, security, or availability tradeoffs come into play?
- How do we guarantee the required Service Level Agreements?
- Are the benefits worth the additional risks?

For many enterprises, the answers to these questions justify the adoption of Public Cloud implementations, including many that provide services to the commercial gaming interests. The level of scrutiny and regulation for those providers does not even approach that which we consider the norm in the public, government-sponsored gaming environment. As a result, lotteries deserve a much more careful adoption of Cloud technologies, performed in a manner that preserves the expectations for operating excellence to which we are all held.

This migration and potential adoption of new paradigms and standardized technologies in our industry has considerable precedence in the past. In the early 1980s, all lottery networks were implemented with private leased lines provided by telephone carriers at great expense. In many cases, these services were unaffordable or not available depending upon the location of the retailers. GTECH pioneered the use of private data radios in 1984 as a solution to this problem for customers around the world and eventually built and delivered the first VSAT network for lotteries in 1992.

The adoption of the Internet Protocol at the end of the 1990s enabled the use of an even wider set of solutions, including 3G and 4G wireless. At every step along this evolution, however, it was incumbent on GTECH to ensure that the solutions maintained the standards for availability, performance, and security that are central to our corporate DNA. The adoption of Cloud-based methodologies will require the same attention to those imperatives. ◆