LESSONS LEARNED, AND VALUE CREATED FROM IMPLEMENTING GSA STANDARDS

CASE STUDY

August 03, 2018

(based on interviews with operators and regulators between February and June 2018)

GAMING STANDARDS ASSOCIATION

OBJECTIVE

In their 2018 strategic plan, the Gaming Standards Association (GSA) board of directors directed staff to learn about the adoption of GSA standards, value derived and impediments. This case study represents their findings.

PARTICIPANTS

The GSA met with North American regulators and operators who volunteered to share their insights and real-world experience on their journey to adopt GSA standards.

IMPACT OF GAMING STANDARDS

This case study will reveal the intended vision, impediments to implementation to be aware of, and the real, measurable value and benefits achieved. We thank all those who participated in this process for their time and expertise and hope it can help others that are on their GSA standards journey.

METHODOLOGY

The meetings were held either in-person or via teleconference and the participants were provided with a series of questions in advance. The questions were open-ended and geared towards generating dialogue. Detailed notes were taken during each meeting.

The result is this case study that presents the benefits and the value-add the standards provide as identified by the interviewees. It further articulates their original vision and goals and identifies the impediments experienced as they sought to implement their vision.

The case study is comprised of Operator and Regulator sections. Each consists of three parts: Vision, Findings and Conclusion. The last section represents an overarching set of conclusions the GSA staff derived from the information shared with them.

EXECUTIVE SUMMARY

The Operators and Regulators interviewed clearly and unequivocally communicated that their use of the standards created by the GSA have added significant value to their companies and jurisdictions.

By gaining access to new data and driving increased levels of operational efficiencies to enhancing gaming software integrity, GSA standards provide a clear return on investment.

Those aware of how widely GSA standards have been adopted across the world agree that the gaming industry in the United States would also benefit from this.

Users of GSA standards are taking advantage of the functionality a new and extensible protocol provides versus the limited capabilities of an antiquated and near impossible to enhance protocol such as SAS and other old-tech protocols.

These users have indicated their support for ongoing GSA standards deployment and for the creation and use of a certification program to ensure uniformity across all implementations. They likewise have asked for curbing so called 'Private' or 'Proprietary' extensions that dilute the standards by effectively creating competing versions.

Lastly both Operators and Regulators are realizing that the most efficient way for GSA standards to be more broadly adopted within the United States is to have Regulatory Authorities mandate them, just like other products and processes have been mandated in the past.

This idea of Regulatory mandate appeared to be equivalent to regulatory overreach for some. Some were also not aware that many of the gaming machines on casino floors in the United States had GSA standards within them. Why should Operators and Regulators in other countries benefit from these technologies while those in the United States lag behind?

A mandate to use GSA standards need not put untenable burdens on Operators, rather they can start small by requiring coexistence of protocols, such as SAS and G2S, in the same gaming device. This would provide added value to Operators without having to change their slot accounting system. Regulators would get value from being able to connect regulatory reporting systems to those same gaming devices without impacting the slot accounting system.

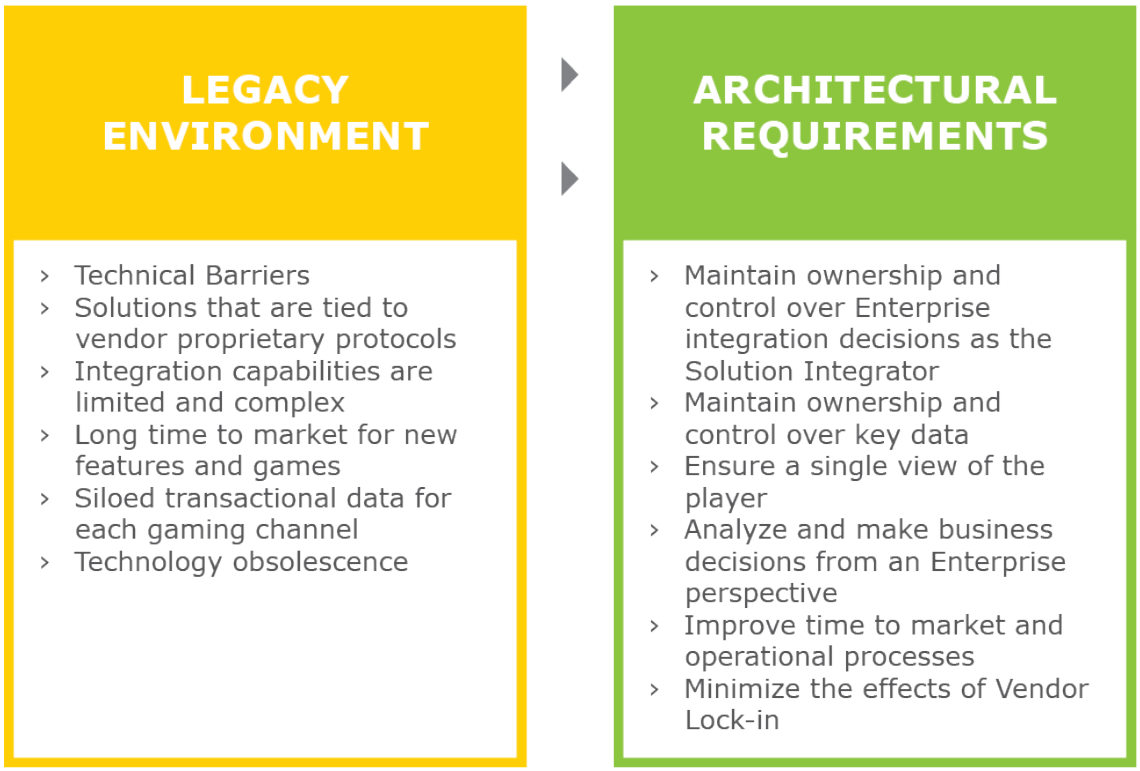
In summary, the standards work and add tremendous value while greatly improving efficiency. Read on to find out more on the value and how you can benefit.

SECTION 1: OPERATOR INPUT

OPERATOR VISION

Ten years ago, Canadian operators gathered to discuss their vision for their future operations: *A long-term transformational initiative intended to evolve a gaming Service Oriented Architecture (SOA) through system enhancement, acquisition, integration and development*.

The group decided that the Gaming Standards Association would be the best vehicle with which to achieve their goals.



A. Technology Priorities identified by Operators

- Support business needs across multiple gaming channels providing improved analytics
- Improve operational efficiencies through increasing business agility and reducing time to market
- Improve relationship management by better understanding the customer

B. Building the Foundation for Business intelligence

Delivering the right game, in the right place at the right time

To position the enterprise for future growth by:

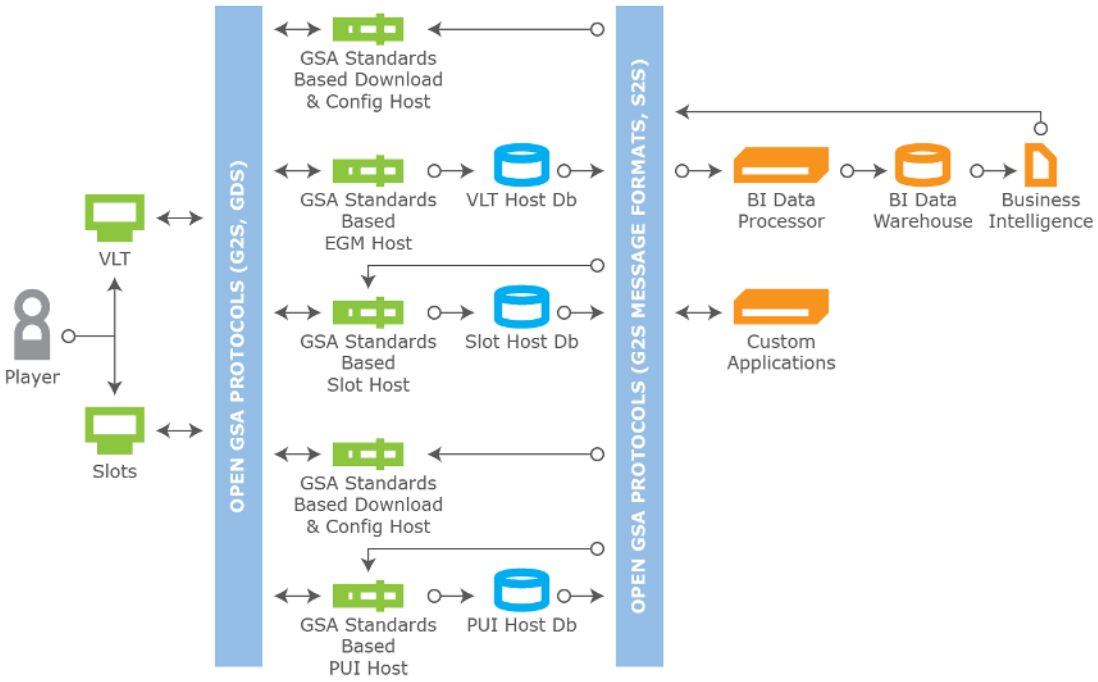
- Ensuring seamless systems integration through standardization
- Increasing the agility to respond to market demands

To improve products analytics across gaming streams by:

- Enhancing the ability to make better product purchasing and placement decisions
- Being able to create comparisons between multiple gaming channels
- Obtaining better insight to the financial performance of the network

To obtain a single view of the customer by:

- Offering a seamless and consistent experience to the customer
- Implementing consistent social responsible programs
- Offering products to the customer in the right place



OPERATOR FINDINGS

A. GSA Standards Benefits and Value

- **The GSA standards**:
  - Have been successfully implemented. The technology is solid.
  - Provide traceability due to the level of data transparency from EGM to System.
  - Have made a tremendous amount of data available that we had not been able to take advantage of before. We now have access to slot data that was not possible using SAS. We can pull this data and provide it to the Slot Analysts in a format that enables them to utilize their tools to identify potential changes needed to increase slot revenues.
  - Have provided us a significantly more stable operating environment both at the System (Host) and EGM OS levels. We have never been as stable as we are now with the implementation of the Game to System (G2S) protocol.
  - Have resulted in faster time to market, higher operational quality and optimization of staff levels.
  - Allow us to update marketing and promotional messages to all EGMs quickly using the Player User Interface (PUI). This provides our Marketing team with the flexibility needed to attract and retain players through engaging and fresh content.
  - Allow the Slot Operations staff to process a Jackpot in seconds instead of minutes using G2S's Jackpot tax W2G report accrual functionality. This not only makes the winning experience better for the players, it allows them to get back in the action faster providing significant value.

- **The GSA standards have by far exceeded expectations in a variety of different areas:**

- The level of operational efficiency resulting from implementing this protocol versus the previous way things were done using the older protocol, has led to a multi-million dollar savings for our organization.

- The standards have significantly enhanced our capabilities to manage our business and have provided the awareness we were looking for.

- The standards have provided us way more than we thought they could ever offer us.

- The standards have opened up opportunities for future growth we could not even envision.

- The G2S standard allows us to utilize and apply the same IT tools and processes to manage the slot floor as we use to manage the enterprise network. This reduces risk, increases uptime, and lets Slot Operations focus on maximizing revenue while IT looks after the infrastructure.

- With the GSA standards, we can remotely log into the network, troubleshoot individual EGMs and take corrective action to bring that EGM back online. This functionality enables authorized Slot Operations personnel to resolve issues within 5 to 10 minutes instead of hours.

An extremely compelling value proposition for the casino operator is the ability to manage many EGM administrative tasks from downloading Operating System (OS) & Peripheral device code to adding other customer-value services.

B. Operator Recognition of The Critical Importance of GSA Certification

- **Not insisting on GSA Certification resulted in:**
  - Initial integration challenges between Host and EGM providers due to the variety of interpretations on how to implement the standard. To resolve this:
    - We were forced to create our own 'how to' guideline that documents how a vendor should build a platform for this market, and how to implement the various classes and messages.
    - The device providers take our 'how to' guidelines and build to that spec. As a result we don't have to act as an integrator anymore. This leads to almost seamless integrations.

- **What would we have done differently?**
  - We should have forced the manufacturers to get together and figure out product integration without us having to be the middleman.

  - We should have asked GSA to be more actively involved in the integration testing.

  - We all should have agreed on a gold standard. GSA Certification is the critical requirement to get to interoperable solutions. Our inability to insist on GSA certification, led to both short-term and long-term pains.

C. OPERATOR OBSERVATION

- Our Host supplier single handedly took a position on any ambiguity in the standard and decided how it should be implemented. GSA was not consulted.

- Today Host suppliers still insist that EGM suppliers sign NDAs before the Host suppliers share their book of 'trade secrets' or the parameters that are unique to their system on how to implement the standard as they interpreted and defined it.

- Supplier extensions to the G2S standard which are protected via NDAs are diluting the value of the standard. The extensions create new proprietary protocol versions. So instead of having one standard we have multiple unique versions. Proprietary extensions should be part of the open standards.

- Few Slot Operators involve IT and Marketing in purchasing decisions. This perpetuates the status quo, i.e. if the Operators are not demanding G2S then why should Suppliers spend valuable resource time switching to it. SAS must be good enough.

- GSA members, who are mostly Suppliers, have a good understanding of G2S capabilities. However, because the Operator member community has diminished greatly, this knowledge is not being shared with them – the consumers.

OPERATOR CONCLUSION

The following conclusions can be drawn from the operator comments:

- Operators confirmed that GSA standards are providing an extremely compelling value proposition that is far exceeding any of their initial expectations.
- Operators recognize that the awareness GSA standards provide is invaluable for overall casino operations.
- Not insisting on full GSA certification by operators was a mistake that has led to unnecessary long-term pains and interoperability issues.
- In the US the segregation of core business units within the casino operation is working counterproductive to the business objectives of optimizing business revenues. The study demonstrates the power of collaboration between casino operations, casino marketing and IT departments but identifies the large shadow over the industry due to supplier secrecy and control modus operandi.
- Individuals managing gaming floors have more technical knowledge about their notebooks or computers then they do about the multimillion dollar EGM's and system equipment that is at the core of their business, but they are eager to know.
- The case study further contrasts the significant lack of knowledge between those operators whom have never participated in GSA and those whom have been an active part of GSA.
- Operators who implement GSA standards see value across the board:

	WITHOUT GSA STANDARDS	WITH GSA STANDARDS
GAMING FLOOR	Serial connections leveraging a vendor proprietary legacy protocol	Open standards extensible protocol, high-speed floor
INTEROPERABILITY	High risk, high cost, high time to market	Certified platforms can be deployed with minimal risk & cost
RESPONSIVENESS TO CHANGE	Limited	Operator-initiated download and configuration to their EGM from a single central system
PLAYER ENGAGEMENT	None	Bi-directional communication with players
BUSINESS INTELLIGENCE	Aggregate data designed to meet the EGM Host's needs	Predictive analytics and real-time dashboards
SECURITY	Vendor proprietary security solutions	Single deployment of shared components, single view of the player
GAMING CHANNEL CONVERGENCE	Monolithic, siloed gaming channels	Open standard extensible protocol, high-speed floor

In conclusion, for operators to protect their gaming investments, they need to mandate devices that support open standards and/or be part of the only organization that is working on furthering innovation and transparency. Industry change can be facilitated to the benefit of the industry and policy domains.

SECTION 2: REGULATOR INPUT

REGULATOR VISION

Regulators are seeking to remain neutral when it comes to protocols used in gaming. They remain focused on ensuring the integrity of gaming, preventing fraud and protecting players. However, to achieve each of those goals they require data. As gaming has continued to evolve they are finding that newer technologies, including protocols, are more capable of providing them with the tools they need to achieve their objectives. Their vision is to see these newer technologies implemented, and to do so either in partnership with the Industry Domain jointly agreeing to adoption, or by gently nudging the industry in that direction. When necessary, some regulators have no issues with mandating the use of certain technologies.

REGULATOR FINDINGS

A. SAS:

Some regulators clearly see that SAS is no longer a viable protocol

- SAS has gone as far as it can go. We are starting to see a variety of issues with this protocol. One example is that suppliers are doing things that the protocol was never designed to do. They are trying to extend its life by doing things such as putting data in buckets they are not supposed to put them into; buckets that were not intended for the purpose they are now being used for. As regulators we are not going to allow that anymore.

B. GSA Standards Benefits and Value

Game Authentication Terminal standard (GAT note 1):

This standard is being used in every gaming jurisdiction interviewed.

- In some jurisdictions, Gaming Regulations require that all gaming equipment support the GSA GAT standard and the regulators rely exclusively on GAT to verify all software, both in the lab and in the field. In other jurisdictions, the regulations specify the methodology that must be met and allow a variety of tools to achieve authentication.

- Prior to implementing GAT there was zero standardization on how gaming components were verified. If we did not have GAT then we would have had to support all of these other verification procedures. We would have had to maintain potentially different verification procedures for every single cabinet. GAT has made it a lot easier to verify the gaming devices.

- GAT and the application we use allow us to collect all data elements needed to store machine specific information. If an issue occurs with a particular piece of software, we can quickly identify where all the machines are and take steps to mitigate the problem. We love the protocol and it is working very well for us.

- Our end goal, the Holy Grail, is to use G2S's GAT capability across the network. That way we can authenticate any applicable device in the field using a single terminal remotely.

- We have communicated to the suppliers that our goal is to use G2S's GAT so we can verify software over the network.

- We are very interested in using GAT 4.0 which updates the encryption algorithm to SHA3 and includes support for Peripheral Devices.

Certification Database Interface standard (CDI note 2):

This standard was identified as a need by the regulators that participate in the GSA Regulator's Committee. CDI is being adopted and is seen as starting to provide the expected value.

- We require independent test labs (ITLs) to also support the CDI.

- We don't yet require the suppliers to support CDI, however that is planned.

- The CDI standard is definitely helping us by providing product testing result data in a consistent way from multiple ITLs.

Game to System standard (G2S note 3):

This standard is seen as having the most potential to help regulators achieve their objectives more efficiently. However, there are implementation and adoption issues that the regulators are seeking to overcome in a manner consistent with their operational methodologies.

- Some regulators are partnering with the industry moving slowly towards full G2S adoption:

    - As a regulator we were struggling on how to move the industry into the semi-modern era. We realized that things would not change without a nudge, so we are now considering a policy giving operators a reasonable period of time to migrate all their EGMs to be G2S compliant and that those EGMs have multiple port support and that those ports are fully open and accessible by multiple systems.

    - We are considering requiring EGM's to support both G2S and SAS. We have frequent conversations with the suppliers to evaluate their ability to support this functionality as it will allow a regulatory server to talk directly to the EGMs.

    - We were also interested in knowing whether or not they supported simultaneous G2S and SAS communication on their devices. At least at that point we could require the game to support G2S without disrupting the casino operator's ability to use their legacy accounting system. Enabling us to report on gaming devices by running GAT over the network would be a win for all of us regulators.

- Other regulators are taking a more forceful approach seeking to utilize G2S capabilities as soon as possible:

    - We are likely to mandate the use of the G2S standard (**note 6**) in the same way that we required GAT within our jurisdiction.

    - The large suppliers have a solid support base for G2S but some of the smaller suppliers do not. The policy change would provide those smaller suppliers the incentive and time to catch up with the larger ones.

Regulatory Reporting Interface standard (RRI note 4):

There is strong interest in this standard and how it provides for a single data exposing methodology for both land-based and on-line gaming, including sports betting:

- We believe that there is value in having one standard - GSA's Regulatory Reporting Interface standard - that provides information from every gaming system/vertical from land-based to online to sports wagering. Especially if it is aligned to G2S and can provide GAT related data, as an example.

- We see having a single data feed as very positive.

Third-party Game Interface standard (TPI note 5):

Some regulators are very interested in the value that this standard is providing:

- The integrations between Remote Gaming Systems (RGS) and Internet Gaming Platforms (iGP) was problematic for us. Many Operators are not getting the content they want because of the integration costs for the smaller suppliers. We wish TPI had been out and we could have adopted it before we launched on-line gaming.

C. Regulatory Observations

- Regulators would like to see GSA take a more active role in creating applications and tools:

    - Provide software tools that are not created by ITL's to support regulators so that they own their own data.

    - Create an application to use GAT that could work with all the suppliers' EGMs (or at least those of the GSA members) instead of forcing regulators to create their own.

    - Create a GAT application that comes with a database to store the tested and approved software signatures.

- Regulators see the lack of awareness within the industry as a major impediment to implementation of GSA standards.
    - Many within the industry are simply not aware of what is available and the value that can be added.
    - There is a complete disconnect within the supplier industry pertaining to GSA standards.
    - Some suppliers have no idea about RRI or CDI. CDI is a standard suppliers can tremendously benefit from. The people responsible for lab submissions have no knowledge of this capability. This is a big deal.

REGULATOR CONCLUSION

The following conclusions can be drawn from the regulator comments:

- GSA is creating standards that are adding value to regulators. Regulators wish that these standards would be more broadly adopted as older technologies are no longer viable.

- Some regulators are realizing that absent a regulatory mandate SAS will continue to exist and perhaps even to proliferate, forcing all to use antiquated technology and holding the industry back. Others are not yet willing to take that approach.

- Some regulators understand that they have the authority, and are even obligated, to require certain technologies, functionality, or processes through mandate. By their very nature, regulations require, or mandate, what suppliers and operators must do to do business legally within this industry.

- Some regulators are looking to implement a intermediate step requiring that gaming devices support both SAS and G2S simultaneously. This will allow regulators and operators to benefit from the additional functionality and data reporting capabilities without impacting the legacy slot accounting system.

- Some regulators have, or are investigating, allowing access to that data over wireless communication eliminating the need for networked casino floors. This access would require the appropriate technical fire-walls and security measures.

- As regulators see great value in participating in the Regulatory Committee but question why other regulators, including Tribal regulators, are not participating?

GSA STAFF DERIVED FINDINGS

INDUSTRY PROTECTIONISM & IMPEDIMENTS

- **Suppliers believe they know best, but:**
  - Supplier's Sales Staff are not trained on protocols, but rather on the game themes, game mechanics, target market and revenue generation (this game is doing 2X house average down the street….). Consequently, they cannot advise on functionality that is critical to IT and Marketing.
  - Even Suppliers that have a G2S-based system do not expose all the data that G2S can collect from an EGM. Instead they decide what data an Operator really needs. As a result, they inadvertently 'dumb down' the capabilities inherent to G2S.
  - EGM suppliers are not supporting or enabling the multi-host connectivity that is a core G2S functionality. This prevents operators from connecting multiple systems to the EGMs and gaining access to the machine data independent of the Host supplier's Casino Management System (CMS).
- **Slot Operations often work within a silo:**
  - Slot Operations is tasked with maximizing slot revenue by making the right purchasing decisions within a tight budget. The protocol the EGM speaks is the furthest thing from their mind, as a protocol is not thought to impact revenue.
- **Operators in general don't know what they don't know:**
  - Operators have a very limited understanding of the capabilities that G2S enables because they have not been participating in GSA and rely solely on their Supplier's Sales staff for information.
  - Operators are uninformed about the benefits of G2S and they are led by equally uninformed Sales staff to purchase EGMs using antiquated protocols with limited technical and data sharing capabilities.
  - Operators are unaware that G2S is a multi-host protocol allowing multiple systems to connect to the same EGM and subscribe to data based on each system's function. The freedom G2S affords Operators to select the best-in-class systems to perform a task is completely lost. They are forced to buy a 'bundled' product from a single supplier.
- **Regulator Challenge**
  - The argument that Regulators cannot mandate requirements that will cause suppliers or operators to incur costs is a baseless one. Regulators today mandate that suppliers must have their gaming products tested by Independent Test Labs costing those suppliers millions of dollars annually. Obtaining a copy of all the land-based GSA standards, for unlimited use world-wide, costs a gaming company just $11,200 annually.

- If regulators do not mandate the use of GSA standards that can benefit them, then the industry will continue to rely on outdated technology for as long as they can. The larger suppliers have implemented GSA because it is required in many parts of the world, but they continue to sell older technology in the US because operators do not know better. The smaller suppliers are potentially never going to implement it because they need a reason to do so.

- The result of the lack of regulatory mandate is that the Gaming Industry in the US is stagnating technologically, while in Europe things are moving forward fast because Regulators are willing to work together and to mandate change. GSA Europe is currently working with Regulatory Authorities from 13 countries collaborating to create a single pan-European standard.

- Some regulators in the US are still applying outdated restrictions to gaming devices such as prohibiting them from being accessed via network outside of the casino. This while simultaneously some jurisdictions are allowing internet-based online gaming and many others are rushing to allow internet-based sports wagering. The idea that online wagering is secure but connecting casino-floor games to online networks is not, seems incongruous.

MANDATE TO CHANGE THE INDUSTRY

The only way change will happen in the Gaming Industry is when an entity that has power – a regulator - mandates that all EGMs support **both SAS and G2S** and provides a reasonable migration period to enable that change to happen.

It's the same as saying that by 2030 all vehicles in the US must meet fuel efficiency standards of 54 miles per gallon. The regulator, the enforcing agency, will have to insist on this sort of change, otherwise – left to its own devices - this industry will trod along with the old stuff forever.

What would happen if regulators mandate that every EGM by 2020 support both SAS and G2S (note 6)?

- This is a small ask for the major EGM suppliers since in addition to SAS, they already have or are implementing G2S to be able to sell slot machines into the growing number of judications that already require G2S.

- This will provide an incentive for smaller suppliers to implement G2S and in the interest of fairness, provide them the time to achieve that.

- Regulators can then install a G2S-based reporting system using all the benefits of G2S such as performing remote GAT spot-checks, verifying all software and subscribing to key data in real-time. This can be accomplished without the need for networked floors, by using wireless and appropriate fire-walling of local in-casino servers and the outside world.

- Operators are not negatively impacted because they don't have to change their slot accounting system. On the contrary, Operators are positively impacted because they too can connect to each EGM using systems that co-exist with other systems, to subscribe to all the data G2S provides which older protocols do not.

- System suppliers are also not negatively impacted. They don't have to develop a G2S-based casino management or slot accounting system.

Who wins?

- Regulators win because they can implement systems that create efficiencies and even help eliminate risks for the operators.

- Operators win because they can tap into all the data that they don't have access to today.

- Suppliers win because it's a minor change to support both SAS and G2S on the EGM side and requires no change to Casino Management systems.

- The industry wins, by becoming more efficient, by harmonizing processes between land-based and on-line and leveraging the latest technology to further secure and make gaming transparent which directly translates into integrity.

NOTES

Note 1: Game Authentication Terminal (GAT): This serial communication protocol is used for identifying and authenticating gaming software and firmware in the field. Used by regulators and operators, GAT allows a master to connect to an EGM via a serial cable and to authenticate the software and firmware components within the EGM. This function is also available within the Game to System (G2S) standard.

Note 2: Certification Database Interface (CDI): This specification addresses the data interchange needs of regulators, test labs, and suppliers. It defines a standard interface for exchanging product approval information amongst regulators, test labs, and suppliers – for example, certification requests, product component information, pay table information, software signatures, associated documents, etc. Future releases will address additional needs, such as field issue notifications and product shipments.

Note 3: Game To System (G2S): This communication protocol unlocks the power of networked gaming and revolutionizes the way information is exchanged between Electronic Gaming Machines (EGMs) and back-of-house systems (hosts). The protocol enables many advanced features such as software download, remote configuration, remote software verification, and a native embedded player user interface (PUI), which are completely new features for most protocols, as well as for many EGMs.

Note 4: Regulatory Reporting Interface (RRI): The diverse reporting requirements for online gaming operations present a major challenge to suppliers of iGaming Platforms, Remote Game Servers, and Progressive Jackpot Controllers. Unique jurisdictional requirements are a major barrier to entry in some markets and have stymied efforts to introduce shared liquidity across jurisdictional boundaries. GSA is working with suppliers and regulators to introduce a new set of standardized reporting requirements that will meet the core needs of the regulatory community while being flexible enough to allow extensions for jurisdiction-specific needs.

Note 5: **Third Party Interface (TPI):** This new specification describes a standardized interface between iGaming Platforms, Remote Game Servers, and Progressive Jackpot Controllers for launching games, recording monetary transactions, posting progressive contributions, awarding progressive jackpots, reconciling interrupted games, etc. The specification fully supports online gaming operations that service multiple operators, affiliates, and jurisdictions, allowing the activity associated with each stakeholder to be easily isolated and reported.

Note 6: Implementing G2S does not mean that every message within the G2S specification must be supported. Rather a small subset of all the functionality supported by G2S, will be identified and agreed to and required by Regulators, such that only the features and functions desired are supported.

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