Casino Technology: Player Tracking and Slot Accounting Systems

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Abstract

The objective of this research is to provide the casino industry with an unbiased, independent study on the available technologies in its business. Both the software manufacturers and the casinos recognize that tracking systems are far from being anything close to perfect. Thus, gaming companies are continually trying to improve the systems that they have on the market. In this paper the authors analyze player tracking and slot accounting systems based on their costs, functions, sizes, hardware requirements, and software requirements respectively, which may help casino executives better understand the technologies available to them and make more prudent and cost-effective decisions on purchasing gaming hardware and software.

Keywords: Player tracking, slot accounting

A Look at the Past

Remarkable technology has effected the method in which casinos run their business today. These new advancements are making data acquisition as simple a task as possible. Collecting useful data is an important aspect in operating a successful gaming establishment. In the mid-1970s, Bally Gaming & Systems, now under the control of Alliance Gaming, developed the industry's first online slot data collection system. An online system is a system that works in real time. This means that once the information is inputted into the database system, it is then immediately accessible to anyone working on the floor or sitting in front of a computer. This online system was called Slot Data System, SDS. Another company that joined the tracking software development market, with the first player tracking system, was EDT, currently known as Electronic Data Technologies, but formerly known as Electronic Display Technology. The company's reason for conceiving a network that allows a casino to keep track of its players was to allow the casino an opportunity to get to know its customers on a personal basis. With that, the casino hoped to have a greater chance of seeing that customer again. EDT believed that one of the casino's primary objectives was to gain customer loyalty. When EDT introduced their technology managers were not receptive to new technology and very few gaming establishments adopted their product. Additionally, managers were uneasy about investing in something that they new little about. Harrah's Atlantic City in 1985 was one of the few properties to adopt the new technology.

The first introduction of a tracking system was given a hesitant welcome from properties in the casino industry. However, slot system vendors were persistent in offering products to the casinos, nonetheless. Other slot machine manufacturers, such as Aristocrat Leisure Industries, and gaming software companies, such as SystemSource, began developing systems of their own. The software developers concentrated in the area of player tracking and slot accounting.

At the Casino Ops '99 conference, Patrice Gianni, president of Marketing Results, Inc., accurately phrased how several gaming properties feel about their tracking systems:

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"What tracking system we have today, we will hate tomorrow." The room filled with laughter because they knew exactly what she meant. Though this computer technology makes player tracking and slot accounting less tedious and more manageable, it does not come without its minor glitches and changes. If an establishment is not already equipped with a computer network of sorts, then because this is something that is not easily learned overnight, it requires additional training for management and employees. Even if the casino is computer-equipped, some training is still needed for the particular system that is being installed. These systems may be complicated at first, but in the end, the beneficial information gathered from their databases will be well worth the time, money, and effort.

To keep up with the trends of technology, such as these, and appeal to masses of current and prospective customers, most casinos have changed their old-fashioned ways and have incorporated tracking software within their network of gaming machines. Before such technology, groups of casino employees were forced to manually keep track of their valuable customers at various venues in the casino, while other groups laboriously kept track of the readings from each gaming machine on the floor. This was a tremendous task, which was time consuming, required much labor, and led to the possibility of erroneous results. To avoid these negative characteristics of manual labor, a majority of, if not all, gambling properties use some sort of player tracking and slot accounting systems to keep track of accounts of the player and of the casino, respectively. Both systems are two necessary components that keep the daily operations of a casino efficient and in working order.

The player tracking software facilitates the casino in observing the habits of its customers. It essentially keeps track of the movement of the player on the floor by noting on what machine the players plays, for how long, of what denomination, and what were his wins and losses. This gives management an excellent outlook on the type of machines that the consumer enjoys playing, as well as the ones that the player ignores. Currently the trend in slot machine gaming is playing on "Australian-style," multi-line video slots with second screen bonuses, multiple-coin bets and a variety of denominations, successfully introduced in 1995 by the Sydney-based company Aristocrat Leisure Industries. The reason for such frenzy in playing multi-line slots is the player's conception that they will have greater chances of winning with more pay lines on the screen and more coins being played. Hoping that these types of machines will be popular to the customer, the casino will buy a few to test the game's true popularity and determine whether its customers are really interested in playing these games and should invest more of its money in these type of slots. Most gaming properties combine their player tracking systems to help them in building a slot club. Members of these clubs are entitled to benefits for being loyal customers to the casino. The initial information, such as name, address, phone number, and birth date, gathered from the players is stored in a database for marketing purposes, but the rest of the information collected from the player's playtime gives the casino the best view of how well its floor is being played.

The slot accounting software works similarly to the player tracking by providing detailed records of the gaming machines on the floor. The software allows casino management to keep track of the meter readings, which include the opening of the slot door, the jackpots and fills, and the coin in and coin out. Besides the aforementioned functions, many slot accounting systems also use this software as a source of security monitoring. Because they take a number of readings over a set period of time, the casino can ascertain from the results whether someone has been tampering with the machinery or if there has been a malfunction with the hardware. In the past, in order for the casino to discover there was something wrong with a gaming machine, myriads of employees would be sent to all the gaming machines and would endure the previously described long, arduous process. They would first have to take the metered readings from all the slots and video poker machines on the floor then, go back to their respective stations to input the data into the mainframe computer and do the necessary calculations (analyzing of the lists of numbers with the hopes of finding the machines working as they should).

If there were something odd about a certain machine, then the overlooking employee would send a technician to inspect it. This tedious practice would result in ancient data that may not always be accurate. While this excruciating practice could take hours, the tracking system could do the same in a significantly shorter period of time by simply matching the metered reading from the ones generated from the computer or by coming across an uncommonly excessive amount of coinage coming from the machine with no recorded high payout. This computerized technology saves money by providing better accuracy and time, allowing employees to spend more time interacting with customers.

Why should a casino be forced to spend so much money on player tracking and slot accounting systems? Essentially, the answer is that the gaming property can produce as much business as it possibly can, thus importantly increase revenue. The information stored in these databases is pertinent in promoting the success of the casino and those who work with these systems, especially the marketing strategists. These strategists are responsible for the various promotions that the casino holds in order to attract the attention and interest of customers. They use the information from the player-tracking module to construct promotional activities that will entertain and generate participation of an intended demographic group. In the same way, information from the slot accounting database accurately reports to the casino the money that is distributed on the casino floor over a period of time. They may notice that during certain times of the day the activity is slow, so they need to create tactics that will bring business to the floor. Many player tracking and slot accounting systems relay their information into one database because it makes it easier for the strategists to analyze the valuable information. This information when analyzed will help ensure that a gaming property is a marketable and thriving business. From the beginning, gaming companies believed that this type of technology would rise in popularity when the casinos come to the realization that "information will become a commodity, and what you do with it will become the differentiator." In other words, in order to take advantage of the possibilities of this tracking software development, one must know how to properly utilize the knowledge being gathered by this remarkable tool.

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Most casinos today clearly see the importance of having all the machines on their floor networked with a tracking system of sorts. This network is the group of interconnected computers that include the hardware and software used to connect them. Because there is a wide variety being offered in the market, it is often difficult to choose from one gaming system or another. Currently, gaming companies are offering these systems to aid in keeping casino properties up-to-speed with all the technological advances. Gaming device manufacturers are not the only ones who contribute to the tracking software market; companies who specialize in data acquisition and information systems offer player tracking and slot accounting software, as well. Many of these companies do not only offer one type of tracking system, but offer several in an attempt to fit the needs of the casinos around the world. For example, not all properties are as large as the ones in Las Vegas or in Atlantic City, so it may be inappropriate for a riverboat in Mississippi to have the same tracking system as a larger casino on the Las Vegas Strip. The software market is constantly growing because these companies are continuously offering new products. If they are not developing new software, then they are upgrading their current ones. In essence, their main objective is to create a software that the manufacturers believe will fit the needs of the casinos in their market niche.

Choosing a Player Tracking System

Features of Player Tracking Systems

In order for a casino and other gaming properties to choose the proper tracking system for their business, they should first consider all the features that each system has to offer. By far, it is not a simple task and takes much time and thought. Because there is so much that is being offered in the market today, it may be difficult to sift through the numerous tracking software packages and select the most appropriate one. A casino should not make a decision by cost alone because usually the price is not the most important factor. In the same way, it cannot base its choice only on the gaming manufacturer's reputation. Because a company has a highly reputable background in slot manufacturing, it does not necessarily mean that it also has the same reputation in creating tracking software. There is so much to take into account. Areas of importance to the consumer should be: cost, the price per machine; function, the tasks that the software performs; size, the size of their gaming property; hardware, the networking and any hardware installation or interface requirements; and software, the compatibility requirements for the tracking software to work properly.

Gaming device manufacturers are not the only ones who contribute to the tracking software market; companies who specialize in data acquisition and information systems offer player tracking and slot accounting software, as well.

Table 1 lists some of the current tracking software on the market. Some gaming companies only develop one tracking software and/or player tracking system, while others create an assortment of software systems to suit the requisites of a variety of gaming properties.

Table 1
Current Tracking Software on the Market

Software Maker	Software Name
Acres Gaming, Inc	Wizard
	Acres Advantage
Alliance / Bally Gaming & Systems	Slot Data System (*SDS*)
Casino Data Systems (*CDS*)	Online Accounting Software Information System (*OASIS II*)
	OASIS/Windows
	BlackBart Slot Accounting
	Super-PlayMate Player Tracking
Casinotek	PlayTrak
Gaming Systems International (*GSI*)	Casino Management System (*CMS*)
International Game Technology (*IGT*)	IGT's Gaming System (*IGS*)
Logical Solutions International (*LSI*)	Slot Marketing System (*SMS*)
	PlayerTrak
	SlotTrak 2000+
Lodging and Gaming Systems (*LGS*)	Slot Accounting and Analysis System (*SAAS*)
	Players$_e$
Mikohn Gaming Corporation	CasinoLink
SystemSource Inc.	Casino Management System (*CMS*)

Considering Costs

Generally, most people believe that the cost is a very important factor to consider when buying a product. Naturally, it is a crucial part in deciding whether to buy a product from one store as opposed to another because the consumer wants to get the most for

what the consumer has paid, but this decision should not rely on the cost alone. The cost of the installation of machines varies from gaming company to gaming company. Though most companies price the installation of a system per machine, some may have one set rate that is paid by the casino or, if the company offers this, they may simply lease the tracking system. A combination of costs adds up to figure the final cost for each casino. The companies usually calculate this bottom-line cost by adding the cost of the software, the cost of hardware, the installation per machine, the training fees, and contracted fees for supplementary maintenance services in the future. The price tag on this investment is not small. It was calculated that in 1991, an average casino would spend nearly $1-3 million on the installation of an online system within the gaming machines, and $3,000-4,000 per month to keep the system in operation. Because gaming properties are diverse, the cost will differ for each establishment. For instance, gaming companies tend to discount their rates per machine as the number of slot and video poker machines increases.

Because there are variations in the cost for installations of machines, most tracking system companies were unwilling to provide an approximate price per machine for acquiring a tracking software system. These companies expressed that they were unable to disclose such information due to confidentiality issues with their clients. Though many of these companies, such as Alliance and LSI, were reluctant to give their rates, some companies, such as Acres and CDS, were less hesitant in providing an approximate price per machine. CDS has four software systems and modules on the market and each is priced at about $1100-$1400 per machine, but may vary depending on the size of the casino. Versions of BlackBart Accounting and Super-PlayMate are basic components of both OASIS II and OASIS/Windows, but can be used individually if the casino chooses to do so. The casino can opt to use all the modules in OASIS or customize the system to the needs of the casino. In conjunction with the software installed, the system consists of certain hardware equipment that must be in all the machines regardless of the combination of modules the casino decides to incorporate. In CDS' estimations, the actual software is a small cost compared to the hardware that must be mounted in or on the gaming machines. However, this is not true for all gaming companies.

Other companies that supplied information relating to the costs of investing in a tracking software system were Acres, Casinotek, and GSI. Again the figures that were given were only estimates. Acres quoted that their slot accounting software, the Wizard, would be approximately $1250 per machine, while GSI revealed that to install their CMS system, it would cost $800-$1000 per machine. Unlike CDS, Acres, and GSI, Casinotek does not sell the software or equipment necessary to network its tracking system PlayTrak; they merely lease it to the casino. Sometimes this option may be more appropriate for a particular casino. The cost of leasing, as does purchasing, a system depends on the size of the casino. Whatever the cost, it is an enormous decision to make.

Small, Medium, or Large?

Not all tracking systems are designed for use in casinos of all sizes. Some slot software companies have a targeted size of casino in which their software is most appropriate, while others are flexible and cater to casinos with various quantities of machines. Table 2 shows each software program with its corresponding, estimated figure of the appropriate size for the specific software. These categories also denote the discounts and price range that may be applicable to the total cost of tracking system software.

Table 2
Classification of Tracking Software by Size

	Small	Medium	Large
Wizard[1]			
Acres Advantage[1]			
SDS[1]			
OASIS II	under 750	750-1200	over 1200
OASIS/Windows	under 750	750-1200	over 1200
BlackBart	under 750	750-1200	over 1200
Super-PlayMate	under 750	750-1200	over 1200
PlayTrak	under 25	25-75	over 75
CMS		500-1000	over 1000
IGS	300 and over	1200 and over	over 2200
SMS	under 750	750-1500	over 1500
PlayerTrak	under 750	750-1500	over 1500
SlotTrak 2000+	under 750	750-1500	over 1500
SAAS	under 500	500-1000	
Players$_e$	under 500	500-1000	
CasinoLink	200 and over	1400 and over	over 13,000
CMS[1]			

[1]not available

It would not be fitting for a small casino to invest a large amount of money on a system that is intended for a casino with a large number of gaming machines. However, some companies have developed systems that are cost efficient for smaller casinos. For example, Casinotek's PlayTrak system supports smaller gaming venues. This may be due to the limitations and specified usage of the PlayTrak system. However, PlayTrak is normally installed in casinos whose floor consists of table games, bingo, and keno. The company believes that the system is compatible and could be used on gaming machines, as well, though this had not been done at the time the article was written.

Mikohn's CasinoLink has the capacity to support a large number of gaming machines and link multiple properties into the system. This allows the collective tracking of multi-site properties into one system, allowing corporate employees as well as casino employees to have access to the data. CasinoLink and PlayTrak provide an illustration that systems have been developed that can fit the needs of most casinos.

What Does It Do?

As the issues of cost or size are not independent of the other factors when choosing a software system, the functions of the software play a major role in that decision. Several software systems currently being offered incorporate other management systems within the programming, aside from the player tracking and the slot accounting. When choosing a system, the casino needs to know what features are appropriate for its business. If the property already has a management system installed in the casino, then it may wish only to purchase the modules that consist of the player tracking and slot accounting systems. On the other hand, the casino may need to network the entire casino with new programming and decide on a complete management system that includes the player tracking, the slot accounting, and other systems. Still, the casino may need a player tracking system, but already owns a slot accounting system, so they need only look for software offering that alone. The possibilities are endless, but the casino must decipher what is necessary in the system they wish to purchase.

Because the main concentration of this research is on tracking software, exclusively pertaining to slot and video gaming machines, the information in Table 3 concentrates on those functions. Though some of the systems include other management software, an analysis of any additional features will not be included here. A tracking software system can perform the tasks of a player tracking system, of a slot accounting system, or of both. When choosing which software product is appropriate for the casino, the casino must decide whether it wants only the player tracking system, only the slot accounting system, or both.

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Nearly all of the systems mentioned perform the function of a player tracking program and a slot accounting program. Many of the gaming companies offer modular components for those casinos that do not need all of the capabilities of the program. For example, the casino may have a player tracking or slot accounting system which they like and know how to use. The availability of modules allows the casino to customize the software to fit the needs of its business. A casino that purchases software capabilities it will not use is wasting hard drive space, memory, and money.

Besides the functions of player tracking and slot accounting, software manufacturers offer advanced and optional modules. Depending on the software package, some of these extra features are already included when purchasing the player tracking and slot accounting functions, while others are sold as stand-alone modules. Some common features include cage & credit which keeps track of the money circulating within the confines of the cage, player club management which helps develop and manage a casino's player club, and floor display which aides in structuring the layout of the gaming machines on the casino floor. These are only a few of the several features that are being offered in casino software packages.

Table 3
Functions of Tracking Software

	Slot Tracking	Slot Accounting	Other Tracking	Other Accounting	Cage & Credit	Other Modules
Wizard		X				
Acres Advantage	X	X				
SDS	X	X				
OASIS II	X	X				OmniVIEW real time floor display, custom report generator, surveillance monitor, BartCADD revenue floor plots, maintenance monitor, RapidPAGE
OASIS/Windows	X	X				OmniVIEW/ BartCADD, PitBOSS, PersonalBanker, ProTURBO progressive setup, RapidPAGE, OASIS Administrator, surveillance monitor, maintenance monitor, standard interface
BlackBart		X				
Super-PlayMate	X		X			
PlayTrak	X					
CMS	X	X	X	X	X	player marketing, slot maintenance, security watch
IGS	X	X	X	X	X	patron management, security, system control, tournaments, restaurant reservations, bus reservations, events, signature verification and registration
SMS		X				
PlayerTrak	X	X				comp management, casino marketing
SlotTrak 2000+						slot club management, system management
SAAS		X				
Players$_e$	X					
CasinoLink	X	X	X			CADDTrak, progressives, Mystery jackpots, security monitoring
CMS	X		X	X	X	marketing

Fulfilling the Hardware and Software Requirements

Connecting the hardware components that are required in the installation of the tracking system software is probably one of the most important parts of the installation process. They are the external elements that make the machines compatible within one network. No matter what system a casino chooses, it must be able to be networked with the company's computer systems. Usually the computers do not have to be of a certain brand name. Some companies do call for a specific processor, such as SDS and IGS, which require IBM RS/6000 and systems from LSI and LGS using the IBM AS/400. Normally, the casino must have computers that meet the minimum requirements in memory and hard drive space. This would generally depend on how many gaming machines the casino has on the floor. Table 4 contains the hardware requirements that a casino must have in order to operate the manufacturers' tracking products.

Table 4
Tracking Software Hardware Requirements

	Machine	Memory	Hard Drive	Card Reader	Display	Keypad	Handheld Computer	Other Hardware
Wizard								
Acres Advantage	Pentium 450							
SDS	IBM RS/6000	16 MB - 1 GB	2–12 GB	X				S-key[1]
OASIS II	PC-based	256 MB	4 GB	X	X	X		
OASIS/Windows	PC-based	256 MB	4 GB	X	X	X		
BlackBart	PC-based	256 MB	4 GB	X	X	X		
Super-PlayMate	PC-based	256 MB	4 GB	X	X	X		
PlayTrak	PC-based	varies[2]	varies[2]				X	
CMS	PC-based	varies[2]	varies[2]	X	X			network card
IGS	IBM RS/6000	128 MB[3]	600-800 MB[3]	X	X			PT95A (player tracking board)
SMS	IBM AS/400	varies[2]	varies[2]					
PlayerTrak	IBM AS/400	varies[2]	varies[2]					
SlotTrak 2000+	IBM AS/400	varies[2]	varies[2]					
SAAS	IBM AS/400	192 MB[3]	16 GB[3]					
Players$_e$	IBM AS/400	192 MB[3]	24 GB[3]					
CasinoLink	PC-based	varies[2]	varies[2]					data collection board
CMS	IBM AS/400							

[1]if the casino does not wish to install a card reader
[2]company could not specify
[3]specifications for an average-sized casino

Other hardware components are essential in having a working tracking system in the casino, besides the network. Though some systems, like the ones from LGS, do not require any extra exterior or interior modules, most others in the industry do. This may be as simple as a card reader or a handheld computer that can read the data from the card or through infrared or radio transmissions from the machines. Many casinos also have a keypad on the machine, so players can access credits that they have previously deposited into an account through their card. With that, players also have the capabilities to redeem their comps directly from the gaming machine. Still, the casinos might desire that a display monitor, such as an LED screen, be mounted onto each machine. These displays can be used to greet the player when the casino's player club card is inserted into the machine, notifying the customer of the amount points which been accumulated thus far. Some casinos also use this as a way to communicate to the player by sending

personalized messages, such as a birthday greeting, to the machine in front of the player. Such systems from IGT and Mikohn ask that the casino integrate supplementary equipment into the machines, such as a network card or player tracking board.

There are two types of gaming machines on a casino floor: reel slot machines and video gaming machines. Though most slots and video games generally have a box-like exterior, the composition of the internal protocol may be different. From speaking with the participating gaming companies (see Table 5), almost all the software available is compatible with both varieties of gaming machines. This is logically true because the exact, necessary hardware must be installed in both in order to make the machines compatible with one another. Similarly, this is how machines from a variety of gaming companies are able to operate with each other. As with other programs that run through a computer, all the involved machines must speak in the same language or protocol, "a set of rules governing the format of messages that are exchanged within computers." The external framework of each reel slot and video poker machine may have its unique features, but through the hardware and software components as the medium, they are able to communicate with each other.

Table 5
Applications of Tracking Software

	Slot Machines		Video Gaming Machines Interfaces with Other Devices
Wizard	X	X	
Acres Advantage	X	X	
SDS	X	X	currency counters, weigh scales, bill validators
OASIS II	X	X	
OASIS/Windows	X	X	
BlackBart	X	X	currency counters, weigh scales, bill validators, bar code wands, meter reading devices
Super-PlayMate	X	X	card embossers, Hollerith punches, encoders
PlayTrak	X	X	card readers, keypads
CMS[1]			
IGS	X	X	currency counters, weigh scales, bill validators, Hollerith punches, keypads, card readers
SMS	X	X	
PlayerTrak	X	X	
SlotTrak 2000+	X	X	
SAAS	X	X	handheld computers, bill sorters/counters
Players$_e$	X	X	
CasinoLink	X	X	
CMS	X		Softcount software

[1]no information received from the company

Casinos do not generally buy gaming machines from one company, but tend to buy machines that they believe their players want to play. Because of this, casinos have an inventory of machines from companies such as IGT, WMS Gaming, CDS, Bally Gaming, Atronic, or Acres. Neither the external nor the internal structure of every machine is the same. Equally, any components attached to the gaming machine, such as a bill validator or a meter reader, must be incorporated with the tracking system. In most cases, the software systems can interface with the likes of any data-reading device, but that is left to the discretion of the software manufacturing company installing the system. Because

gaming companies know that different companies manufacture much of the hardware on the casino floor, they try to make sure that their program can be connected with whatever data mechanism exists in the market. Gaming companies have a general list of products with which their tracking software is compatible, so before a casino buys a tracking system, it should be aware of the compatibility restrictions with the equipment it has currently.

The software factors to consider when choosing a tracking system for an entire casino property are the platform, the database, and the compatibility features

In addition to the hardware requirements with which the casino must comply, it must also meet the software specifications in all the computers through which the tracking software will be processing. This entails the installation of the essential software before using the tracking software. Though some casinos would normally fulfill the prerequisite conditions for the software, some already have an existing computer system and simply need to find a software system that meets its computer needs. The software factors to consider when choosing a tracking system for an entire casino property are the platform, the database, and the compatibility features. The platform is essentially the language that regulates the way data are transmitted between computers. The database stores the information collected on the casino floor. The compatibility features allow for the possibility of interfacing with previously installed systems and software within the computer networks.

Table 6
Tracking Software Platform Requirements

	NT	Novell	AS/400	Other Platform
Wizard	X			
Acres Advantage	X			Proprietary
SDS				RS/6000 AIX, dBASE III
OASIS II	X	X		BTRIEVE
OASIS/Windows	X			
BlackBart	X			
Super-PlayMate	X			
PlayTrak	X			
CMS	X	X		DOS
IGS				RS/6000 AIX
SMS	X[1]		X	
PlayerTrak	X[1]		X	
SlotTrak 2000+	X[1]		X	
SAAS			X	
Players$_e$			X	
CasinoLink	X			
CMS			X	

[1]has an NT server backup

As generated in Table 6, tracking software systems are capable of running on different types of platforms. Some, such as systems from LSI, have developed different versions of the software for the different operating systems. Some older versions of the current software available today once worked on one operating system such as DOS. This was due to the technology that was accessible to them in the past, but they have gradually upgraded those versions to the more commonly used NT platform. Accordingly, as listed on the table, the NT software is the driving operator for 12 out of 17 software systems. The remaining 5 programs operate on IBM systems software, Novell software, or other proprietary software. Those companies that offer software that uses some variation of

software in the IBM family typically are required to run on its hardware counterpart, such as the IBM AS/400 or the IBM RS/6000. With that, as mentioned before, a casino cannot base its decision to buy a tracking system simply on one factor alone because there is a connection of sorts among all the factors involved.

Another factor to consider, similar to that described in the previous paragraph, is the type of database that the tracking system sends all the data collected from the casino floor. In the past it was common to have different modules in a tracking system transmit the information that it collected from the gaming machines and/or the players into separate database systems. With an operating system established in that manner, none of the information between the systems was shared. In order to take advantage of the information being stored in the databases, data in these databases need to be incorporated and analyzed appropriately. Most casinos try to store all their data on one database system, whether its data comes from one software company or multiple companies.

All the software programs listed in Table 7 gather their entire player tracking and slot accounting data into one database system. This database system requirement will vary from one manufacturing company to another, but will likely be from the same manufacturer that developed the platform on which the tracking software operates. For example, most of the software programs which operated on an NT platform system also require that the database that it relays information to be the SQL Server. Gaming manufacturers who use IBM hardware and a UNIX-based platform run a compatible version of IBM's proprietary software to serve as its database. Just as a particular tracking software program must run on a specific platform, the casino must also have the necessary database to store all the data and information that is constantly being compiled.

Table 7
Database Requirement

	SQL Server Database	Other Database	ODBC Compatible
Wizard	X		
Acres Advantage	X		
SDS[1]			X
OASIS II	X		X
OASIS/Windows	X		X
BlackBart	X		X
Super-PlayMate	X		X
PlayTrak	X	Legacy	X
CMS	X		X
IGS		Progress	X
SMS[1]			X
PlayerTrak[1]			X
SlotTrak 2000+[1]			X
SAAS		RBG 4	X
Players$_e$		RBG 4	X
CasinoLink	X		X
CMS		DB 2	X

[1]was not able to disclose

In discussing the functions of the software, each program was sorted into various features and modules. The two main modules that were looked at in detail were the player tracking and slot accounting components. Looking back, not all the existing tracking systems implemented both functions. Nearly half of the systems performed either the task of player tracking or of slot accounting. When casinos or other gaming properties opt to invest in a tracking system, they may already have an existing one installed and are

satisfied with most of its features but not all of them. They then might decide to incorporate another system to supplement or replace the aspects that they would like to improve. The question of whether the two networks will be compatible with one another is important. Unfortunately, not all systems will interface with other systems. Most gaming companies can interface with software that other manufacturing companies have on the market. They normally have a list of companies and systems with which they are compatible. The companies offer extra hardware and wiring to link the systems together called gateways. These gateways allow the two systems to communicate with one another and transmit the information they receive—from the player or from the machines—into one database system. Though casinos find it inconvenient in supporting two forms of tracking, several casinos still decide to use a combination of tracking software—usually one for player tracking and the other for slot accounting. For example, a few properties use the Super-PlayMate from CDS for the player-tracking module in conjunction with SlotTrak from LSI for the slot accounting module. Both CDS and LSI have total packages that can fulfill both functions, but neither CDS nor LSI has a complete system with which the casinos were contented. Because of gateways and other interface cablings to provide the communication between the two systems, the casino has a working network that will meet its needs.

Future Trends

Because the advances in technology are relatively unpredictable, no one is certain what types of technology lie in the future. Even so, both casinos and gaming companies know that technology constantly is altering the gaming business and they should prepare for what still lies ahead. Casinos drive the rapid rate of the development of new products and features being introduced into the market, in that the gaming manufacturers continually promote new products and ideas. Though most gaming establishments are networked with tracking systems, they are still requesting that the system be improved or include certain features that their software lacks.

More and more software manufacturing companies are trying to incorporate all facets of the casino industry into one system. A growing number of casinos have expanded the services they offer. Instead of simply being a chain of casinos or of hotels and casinos, they have added theme parks, theatrical shows, and shopping areas into their venues. Each of these additions has their own tracking systems that keep track of their customers. Management, being hotel or casino, is always looking for a simple system that consists of all the aspects customized to fit the unique necessities of its property. With several tracking systems scattered all over a property, the casinos try to interface them in order to satisfy their particular needs. This can be both inconvenient and quite costly. With an all-in-one system, casino management has the opportunity of working together to make decisions that will be valuable to the casino, hotel, and other entertainment facets of the business. There are some companies who are producing such a system, but several gaming facilities feel that the system is not fulfilling the needs and expectations that were originally expected. Consumers in the gaming industry do not want to spend an enormous amount of money on a system that does not meet their needs. They know that everything has its price, so they want the best they can possibly obtain with their limited funding.

The purpose of this study is to inform casino operations of what is available to them by software manufacturing companies. In turn, this is also beneficial to the gaming companies who should be willing to listen to the constructive criticism given by the consumers that use their systems. They are aware that they do not offer a system that will meet the needs of all casinos. Therefore, using this information and consumer feedback to address the weaknesses of tracking software in general, they are able to offer a better product. Both the software manufacturers and the casinos recognize that tracking systems are far from being perfect, and that is the reason these gaming manufacturing companies are continually trying to improve these systems or develop new ones. When the first

tracking system was originally introduced, there of course, were numerous problems with it, but as time passed, gradual improvements were made to enhance the system. As the future approaches, new developments in technology will aid in the growing popularity of the tracking business. With the casino's goal of attracting the 21 and over demographic of the growing population into their casinos, they will dedicate their time, their money, and their sanity in benefiting from the marketable use of the player tracking and slot accounting systems.

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