



White Paper

Exposing Retailer Lottery Fraud with Identity Resolution

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Executive Summary

Since octogenarian lottery player Bob Edmonds successfully sued the Ontario Lottery and Gaming Corporation in 2005, detection and prevention of retailer fraud has become a high profile issue for all state and provincial lottery organizations. Lottery directors realize that increasing revenue alone is not enough to ensure success. If there is a perception of fraud, public opinion will greatly increase pressure on investigators and legislators to ensure that players receive fair and equitable treatment.

This white paper describes how identity resolution technology such as Infoglide Software's Identity Resolution Engine™ (IRE) should be a key component in exposing retailer lottery fraud and improving lottery players' confidence in lottery systems.

IRE aggregates information from existing data stores to form a clear, comprehensive, composite depiction of the identity of an individual or other entity. IRE glides across

multiple data sources while protecting the privacy and confidentiality of the data, applies sophisticated similarity search techniques to resolve multiple identities in real time, and presents a unified view of individuals that highlights otherwise hidden relationships based on the similarity of multiple attributes. IRE's patented Similarity Search algorithms, rules, and decisioning capabilities make it unique in the identity resolution market. Organizations can experience the power and flexibility of IRE right out of the box with an easy-to-install executable. Since IRE features are exposed through a set of administrative and run-time Web Services interfaces, integration is simple and straightforward.

Lottery organizations can now address retailer lottery fraud by adding powerful technology to existing systems to resolve identities and highlight hidden relationships using Infoglide Software's IRE solution.

Is Retailer Fraud a Major Issue for Lottery Organizations?

After the Bob Edmonds successfully sued the Ontario Lottery and Gaming Corporation in 2005, Lottery and Gaming Minister David Caplan said that, despite the implications of the findings, the lottery system does have strict security controls. "I think that the public should have a great deal of confidence in the Ontario Lottery and Gaming and in the lottery system," he said. "We have some of the most stringent security measures in North America. In fact, we have recently enhanced those and if there is more to be done the public should be assured that it certainly will be."¹

Should more be done to protect the lottery systems from retailer fraud? The facts around the current reality of retailer lottery fraud suggest yes:

- Canadian police accused a Toronto-area man who claimed a C\$5.7 million (US\$5.7 million) prize in a national lottery of fraud, the first charges in a year-long probe of Ontario lottery-ticket retailers.
- Hafiz Zulwarnain Malik, 60, of Mississauga, Ontario, was charged with two counts of fraud and one count of theft over C\$5,000 after cashing the winning ticket in January 2005. Police say the ticket actually belonged to a group of four people from the Toronto area who was defrauded out of its winnings.

- Canadian Broadcasting Corp.'s "Fifth Estate" program reported in October 2006 that Ontario lottery clerks and retailers won prizes exceeding C\$500,000 almost 200 times in seven years, far more often than the 57 victories that might be expected based on odds.

Jeffrey Rosenthal, a statistician and author of "Struck by Lightning: The Curious World of Possibilities," told the CBC the odds of 200 such wins among 60,000 lottery retailers over seven years were one in a trillion, trillion, trillion, or a 1 with 48 zeroes.

- Some retailers were accused of giving customers a free ticket or a small cash prize, when the ticket actually won a prize in excess of C\$500,000. The ticket retailer, or a family member, would later claim the real prize, CBC reported.²

Ontario Lottery and Gaming Corp., which runs the provincial lottery system, has changed the rules and now requires ticket buyers to sign their ticket when cashing a prize.

Clearly lottery fraud exists, but what makes it a major issue for lottery organizations? The issue is fairness. When lottery players perceive a lottery as unfair then they will simply stop buying lottery tickets. Bad publicity leads directly to decreased participation. Decreased participation means decreased sales and that is certainly a major issue for any lottery organization.

¹ <http://www.cbc.ca/canada/story/2006/11/21/lottery-probe.html>

² <http://www.lotterypost.com/news/167695>

Are Existing Efforts Enough to Combat Retailer Lottery Fraud?

Initial efforts by lottery directors to combat fraud included improving lottery claim processes and retraining retail employees. In some states, lottery retailers have been supplied with “self-checkers” that allow participants to check their own tickets to see if they have won.

The Colorado Lottery’s web site³ lists several security tips for participants:

1. Always sign your tickets. If it's a winner, only you will be able to claim the prize. And, if it's not a winner, you may be able to enter it into a second-chance drawing.
2. Use the self-check ticket checkers available at many retail locations. This will ensure that you are paid properly for your winning tickets.

3. Ask to see the cash receipt for all winning tickets. You cannot keep the receipt, but it will tell you how much you've won so you can double-check it against the amount given to you by a retailer.
4. If you suspect a retailer is not giving you your proper prize, please let our investigations team know, and we can help you resolve the issue.

Unfortunately, despite added measures, significant amounts of retailer lottery fraud still go undetected.

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<http://www.coloradolottery.com/index.cfm/ID/95/Security-Tips---Colorado-Lottery/>

What Is Required for Effective Retailer Lottery Fraud Prevention and Detection?

The deception practiced by lottery fraudsters is to substitute their identities for the identities of the true winners in order to fraudulently collect their winnings. Identity resolution technology can increase the odds of uncovering this type of deception and even preventing it.

Identity resolution means knowing who is who, who knows whom, and what is what across unique data sources. In the case of lottery fraud, it looks at who you are, who you know, and what you are connected to. It collects all the information known about a person in order to determine whether you are a “good” retailer or a good citizen, whether you are a risky individual who should be identified and flagged, or whether you have a hidden connection to a fraud network.

Identity resolution effectively uncovers lottery fraud by:

- Discovering the true identity of the person claiming the winnings.
- Looking for evidence of deception like intentionally obfuscating names, addresses, telephone numbers and other personal characteristics when collecting winnings to throw investigators off the trail.
- Identifying non-obvious relationships by comparing identities between and within available data sources. Patterns of deception by dedicated fraudsters are not obvious because the perpetrators try to hide their relationships.

- Utilizing data that is available on:
 - Winners - Historical data collected on winners
 - Retailers – Data on persons who sell tickets and help identify winners on behalf of lottery organizations. Some states, for example, require retail employees to register for training on a web site before they can sell lottery tickets.

For example, a retailer with intent to defraud would suspect that if a single person collects winnings far too often, the lottery organization would probably become very suspicious. Such retailers will obfuscate their name information when filing for winnings and will also use friends, colleagues, and relatives to collect winnings on their behalf. These simple deceptions will work when practiced against procedural methods involving simple database lookups. More powerful identity resolution technology, however, will identify relationships across several degrees of separation and can uncover even elaborate fraud schemes. Identifying and prosecuting fraud has a deterrent effect, so stopping one dishonest retailer and publicizing it can prevent multiple future fraud attempts.

Often lottery organizations are also required to check for indebtedness of interest to the government before paying out winnings. Examples of such indebtedness might be delinquent taxes, child support arrearages, liens, garnishments, and the like. Identity resolution provides a valuable secondary benefit by rapidly performing cross-database checks to ensure that any indebtedness of government interest is identified before paying out lottery winnings.

What Makes Infoglide Software's Identity Resolution Engine™ (IRE) the Best?

Infoglide Software's Identity Resolution Engine™ (IRE) is a unique, carefully engineered enterprise solution that satisfies the growing need for identity resolution to combat retailer lottery fraud.

IRE aggregates information from existing data stores to form a clear, comprehensive, composite depiction of reality about the identity of an individual. IRE glides across multiple data sources, applies over 50 sophisticated Similarity Search algorithms that calculate the distance between search and target attributes, and presents a unified view of an individual or entity that highlights otherwise hidden relationships based on the similarity of multiple attributes. In addition, IRE provides a user-friendly web client from which searches can be configured and executed.

IRE not only meets but exceeds the requirements of an identity resolution solution that lottery organizations need in order to effectively uncover and deter retailer lottery fraud. As further evidence of how IRE is an asset to combating retailer lottery fraud, the sections that follow provide descriptions of IRE's capabilities, integration, and configuration.

Capabilities

Identity Intelligence

Basic similarity search results are powerful but not sufficient to power all real-time operations. Lottery investigators must distinguish what a match between two records indicates – the same person, a shared household, or identity fraud – to know what actions should be taken.

The identity intelligence provided by IRE goes beyond providing simple search results and singles out who is related, how they are related, and even how they are not related. For example, IRE can highlight two individuals who share an active private label credit card but share neither a name nor address, or it can determine that two individuals share a residence.

The higher level identity intelligence provided by IRE simplifies business rules development and business applications by reducing data noise and false positives in identity resolution results.

Different Structures

Many times, the data contained in one database is in a different structure than in another database (e.g., Full Name in one column versus First Name, Middle Name, and Last Name in three separate columns). IRE assists the matching process by mapping data with the same meaning across multiple databases on the fly. Infoglide Software's Similarity Search algorithms provide additional support by handling cases in which, for example, a middle name is missing, the first and last names are transposed, or initials are used.

By making such associations, IRE can search data and find hidden relationships within multiple sources regardless of data type or physical location.

Detects Hidden Relationships

IRE discovers hidden relationships between individuals by evaluating the degree of similarity between their attributes and extending the recognition of relationships beyond a single degree of separation. The combined activities of lottery fraudsters who share addresses, phone numbers, and other personal data are readily exposed.

IRE's web client includes a sophisticated relationship-charting capability (shown in Figure 1) that graphically displays hidden relationships among multiple data sources.

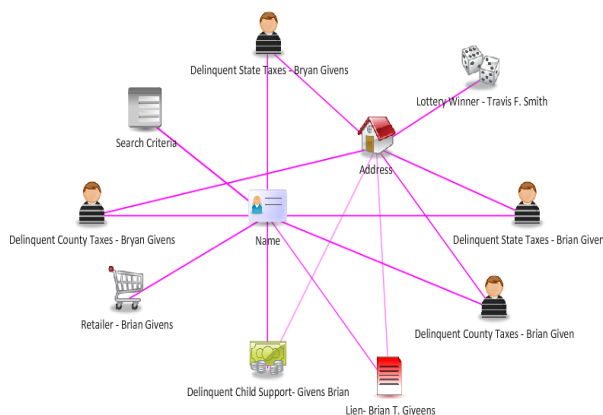


Figure 1 IRE Link Charting

For example, the link chart in Figure 1 is the result of using IRE to search for the name, Brian Givens, and looks at two degrees of separation. The results reveal the following:

- Brian Givens is a retailer and has delinquent child support, county taxes, and state taxes.
- Brian Givens shares an address with Travis Smith who is a previous lottery winner.
- Brian Givens shares an address and similar name with Bryan Givens who has delinquent county and state taxes.
- Brian Givens shares an address and similar name with Brian T. Giveens who has a lien.

Based on these results, Brian Givens would most definitely be considered a person of interest.

Multiple Data Sources

IRE performs identity analysis across multiple data sources such as historical data on lottery winners, data on persons who sell lottery tickets, publicly available address data, etc. The data may be located in one or more databases and may be internal to the lottery or external.

Although IRE does not require data warehousing, it supports automated loading of data from extracts or other databases through its scripting facilities so data can be staged when appropriate.

Disparate Systems

Searching across different sources of different data types to return a unified result is a key strength of IRE. Information from heterogeneous MySQL, ODBC, or JDBC-compliant databases can be transparently similarity searched to resolve multiple identities and discover hidden relationships.

Sophisticated Decisioning

Building upon its identity intelligence, IRE offers a variety of configurable decisioning engines.

For straightforward tasks, a scripting engine automates the evaluation of identities. In response to a detected condition, the engine can perform additional searches or decisions, add a record to a database, send a message via e-mail or message queue, or apply a label. More complex decisioning is supported by a rules engine with a rich, high-performance programming language environment. The engine makes complex reasoning – such as “flag a retail employee who shares a household with a lottery winner” – straightforward to implement.

A record of the decisions made is available from IRE's audit log so that you can implement automated decisioning while also maintaining a traceable data trail.

The decisioning engines above can be integrated using web service interfaces to enhance existing or new applications and business processes.

Real Time

IRE's patented similarity algorithms are designed to quickly and accurately return otherwise undetected results. This not only produces the desired results, but IRE provides them when they are needed.

Real time also describes the nature of the searched data. Matches can be made against cached data sets, live databases, local web services, or external data vendors.

Integration

Infoglide Software's IRE utilizes a Web Services-based architecture (shown in Figure 2) that allows for an easy and secure integration with both traditional enterprise and Service Oriented Architectures (SOAs).

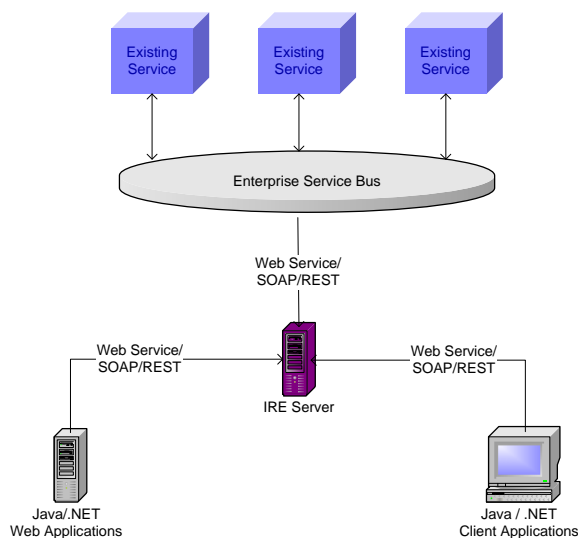


Figure 2 IRE Integration Model

IRE features are exposed through a set of administrative and run-time Web Services interfaces. IRE's service interface implementation minimizes total cost of ownership by supporting integration with new and existing versions of the following:

- Java and .NET applications (or other Web Services consumer)
- SOAs and Enterprise Service Buses (ESBs)

IRE's Web Services-based architecture eliminates the need to copy and maintain external data sources by utilizing programmatic interfaces (clients) and a standard protocol such as SOAP or architectural style such as REST to request and receive information in real time. In addition, SOAP and REST web service endpoints permit easy interoperability between systems while delivering IRE's rich features.

Security and Privacy

Balancing the need to resolve identities is the need to ensure that the information is used responsibly so that each individual's right to privacy is protected. IRE was designed to protect the privacy of data and to ensure its secure transmittal. IRE's security features support privacy protection policies while allowing an organization to maintain responsibility for enforcement (e.g., allowing or denying the secure transmittal of confidential information). Like other features within IRE, users are able to configure security features to control their actions based upon the requirements for a specific implementation.

Security

- IRE web services support industry-standard WS-Security for authentication.
- IRE web services support industry-standard HTTPS/SSL encrypted transport.
- IRE authentication and authorization layer can be configured to work with a variety of customer sources.
- IRE configuration files can be encrypted using either a standard out-of-the-box encryption mechanism or an optional customer-provided encryption mechanism.

Privacy

- Search can be configured to return the similarity score without returning the associated data.
- Search service can be configured to return top scores by target type with full document details and scores, document locators and scores only, or top scores only.
- Details used to derive relationships can be hidden while still exposing valuable intelligence (e.g., this person shares a household relationship with a lottery fraud suspect).
- Organization-specific decisioning rules/policies can be written to return the decision (“hire” versus “no-hire”, “investigate” versus “do not investigate”) without disclosing the details behind the decision.
- Database credentials are encrypted.

Standards-Based

IRE does not require an expensive overhaul of existing technology infrastructures. Instead, its standards-based architecture greatly enhances and extends existing systems.

Built upon a variety of standard technologies – ranging from SOAP web service interfaces conveying XML data over HTTP/S transport to a J2EE application server that leverages databases via MySQL, JDBC, and ODBC – IRE employs clever algorithms to achieve superior results on commonplace systems and perform well in a heterogeneous environment.

The non-disruptive and non-intrusive addition of powerful algorithms resolves multiple identities despite input errors or attempts to deceive.

Scalable

IRE’s heritage includes responding to demanding requirements from day one. Development of Infoglide Software’s technology was driven by requirements to process up to 3.5 million transactions per day for the Department of Homeland Security’s airline passenger screening application, so it is no surprise that uptime, high throughput, scalability, response time, resource management, and manageability are delivered out-of-the-box with each IRE installation.

Easy to Administer

IRE’s architecture includes a web-based configuration and administration layer enabling end users with the appropriate permissions to manage their data source connections, create search profiles, and create and debug rules. Services are further exposed via SNMP and JMX for integrated management.

The configuration and administration layer allows configuration and customization of IRE to suit specific needs and to eliminate the need for a lengthy implementation period that can only be performed by trained personnel. IRE can be managed by a standard database administrator (DBA) without the need for extensive training.

Configuration

Proven Approach

Infoglide Software has leveraged its extensive experience in the identity resolution market to create a unique and effective approach to uncovering who's who and who knows whom. This approach is carried out using IRE and consists of the following stages:

1. Develop a search strategy based upon the business' goals that will maximize the chances of identifying exact, similar, and linked records in the data. It is usually very inefficient to search all the data available; therefore, part of this stage includes determining what data set(s) will provide the most answers and then restricting the searchable data to only those sources.
2. Execute a broad search using IRE in order to return a candidate set of matching records. To maximize the chances of returning the desired results, it is necessary to expand the search criteria to sweep the data with a wide net.
3. Qualify the results of the search by applying a post processing scoring mechanism that filters out records from the candidate result set that have disqualifying or contradictory attributes while highlighting linked and shared attributes among candidate records.
4. Devise and apply domain specific business rules that intelligently sort, prioritize, filter, and process the search results in order to make qualified decisions needed to solve the business problem.

By applying the approach outlined above, processing time is reduced since different search algorithms can be employed during different stages (i.e., faster algorithms during the broad search stage and more intelligent algorithms during the scoring stage), better intelligence is applied in order to identify matches, and results are improved because domain specific filters highlight only those records and relationships that are relevant to the end user requirements.

Adaptable

IRE's configurability enables it to protect an organization's technology investment by adapting to evolving threats. As adversaries' tactics evolve, IRE can be tuned and its capabilities expanded by configuring new or enhanced:

- Data Sources – Readily integrate new internal and external data repositories with an existing solution. Reconfigure existing repositories to exploit new policies or techniques.
- Search Profiles – Adjust search attributes and similarity search algorithms to make better use of personnel and financial resources when pursuing threats.
- Discovery Profiles – Adjust which profiles are assembled and which relationships are identified to optimize efforts. Annotate and filter search results for more intelligent aggregation and decisioning.

- Identity Profiles – Determine how and when individuals are identified as members of a group of interest.
- Decisioning Rule Sets – Define rules that detect evidence of interest in search, discover, and identity results.

Conclusion

In summary, restoring and maintaining confidence in the integrity of the system is crucial to a lottery's continued success.

Identity resolution software is the best way, and in many cases the only way, to identify fraudulent activities, restore integrity to the system, and prevent future deception in the lottery and gaming industries.

IRE's commercial, off-the-shelf technology can ensure compliance by retailers with lottery rules and procedures by providing the following:

- Easy integration into existing infrastructures;
- A proven approach to implementing and configuring an identity resolution solution;
- Similarity Search technology that uses sophisticated algorithms to search across multiple attributes and data sources to provide a single view of an individual;
- Relationship and identity resolution technology that automates, analyzes, and augments search results to uncover related individuals;
- Identity intelligence that distinguishes matches and simplifies results;
- A decisioning engine that uses customizable rules to apply business logic to both incoming data and search results in order to customize how an overall "decision" or "classification" is reached; and
- Customizable components that are designed to ensure that IRE evolves with lottery organizations and their adversaries.

About Infoglide Software

Infoglide Software Corporation (www.infoglide.com) supplies identity resolution (also known as entity resolution and analysis) solutions to the lottery, insurance, retail, and government markets. The company's solutions enable organizations to detect fraud and risk by analyzing data related to individuals and/or entities within multiple data silos throughout the enterprise. The company's Identity Resolution Engine (IRE) uncovers matching identities and non-obvious relationships, applies domain specific rules and automatically integrates the resulting business intelligence into an organization's systems and processes in real time. Applications include retail returns fraud detection, retailer lottery fraud detection, e-fencing and organized retail crime detection, workman's compensation fraud detection, employment application screening, and insurance claims fraud detection. Incorporated in 1996, Infoglide Software is a privately held company headquartered in Austin, Texas.