FICO | Decisions

Analytics Everywhere

Using Analytics to Enhance Tax Administration

Ted London
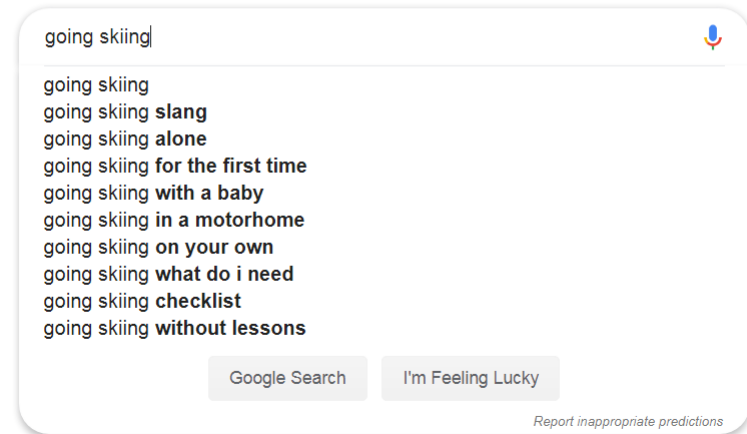Director, FICO
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Imagine if you could Predict the Future…At Work

- Which newly registered businesses need proactive education to avoid becoming delinquent

- Which businesses will produce the greatest audit assessment

- Which collection cases will pay if you only sent them letters

Examples of Predictive Analytics in the Real World

- On-line shopping: Users who have bought X have also bought Y

- Netflix movie recommendations: 80% of movies watched is based on automated recommendations

- Personal Banking: Requesting a credit line increase

- Credit Cards: "Was this transaction really you?"

- Facebook: News Feed

- Customer Management: Predicting customers who might stop using a service based on usage

- Email SPAM Filtering

going skiing
going skiing
going skiing **slang**
going skiing **alone**
going skiing **for the first time**
going skiing **with a baby**
going skiing **in a motorhome**
going skiing **on your own**
going skiing **what do i need**
going skiing **checklist**
going skiing **without lessons**

Google Search   I'm Feeling Lucky

*Report inappropriate predictions*

Agenda

- Analytics Introduction

- Analytics Opportunities:
  - Audit Selection
  - Collections Management
  - Customer Service
  - Network Analytics on registrations and refund requests

ANALYTICS MATURITY CURVE

DESCRIPTIVE

DIAGNOSTIC

PREDICTIVE

PRESCRIPTIVE

Predictive Analytics: What it is

- A process that **uses data** to **create a score** which will **predict an outcome**

- Predictive Analytics encompass a variety of mathematical techniques that derive insight from data with one clear-cut goal: find the best action for a given situation

- Predictive analytics increase the precision, consistency and speed of the decisions you make

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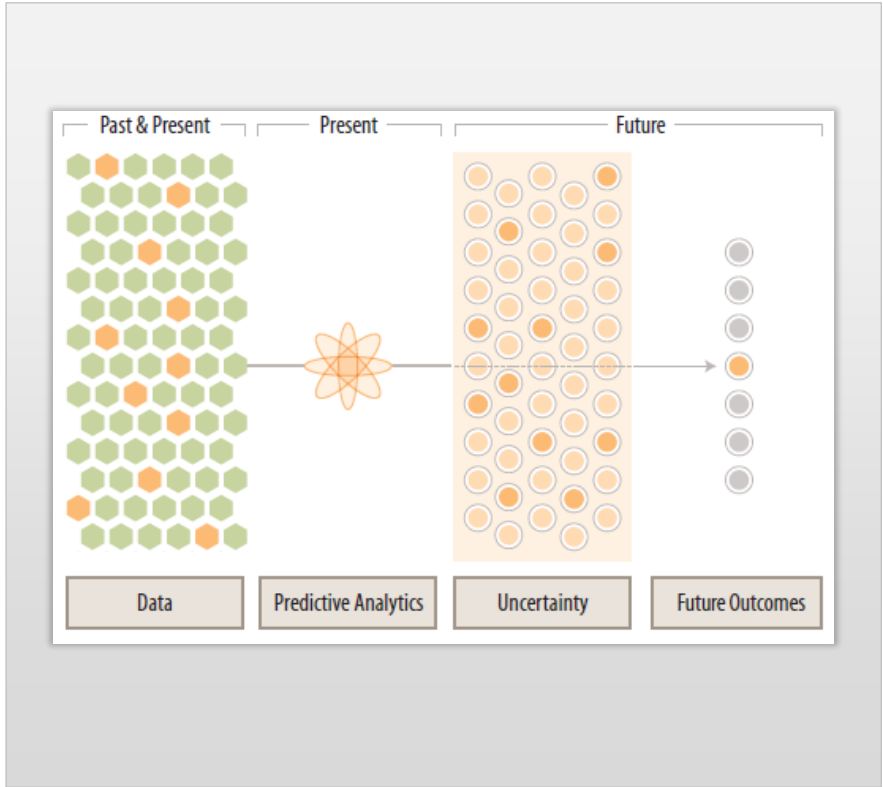
Prescriptive Analytics: What it is?

- Calculates the outcomes from different treatment approaches

- Works with competing goals
  - Most Revenue (this year)
  - Voluntary Compliance (next year)
  - Least Intrusive
  - Lowest cost

- Looks across your entire business process

- Balances resources, factoring in constraints

- Prescriptive Analytics Identifies the best **outcome** from a possible set of **decisions**, based on business **objectives** and **constraints**, using **mathematical algorithms**

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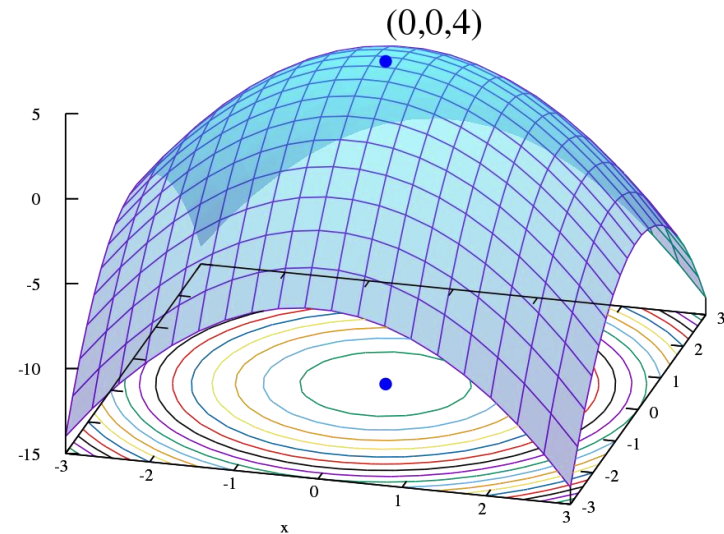
Benefits from Using Analytics

Efficiency

- Focus efforts on taxpayers where your interaction will result in revenues or a change in behavior

Customer Service

- Minimize strong compliance actions on taxpayers who are filing properly or will pay

Fairness

- Allows you to assure similar taxpayers receive similar treatment

Revenue

- By working "better" cases, your staff will be able to bring in more revenue

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- Measure whether decisions are having the desired effect

  - Percentage of self-cures

  - Number of phone calls

  - Number of repeat delinquents

- Models use the results of your performance to re-calibrate themselves

- As the economy changes, business rules change, or laws change the models get "smarter" over time

- Models no longer get stale – they use actual performance results to improve themselves
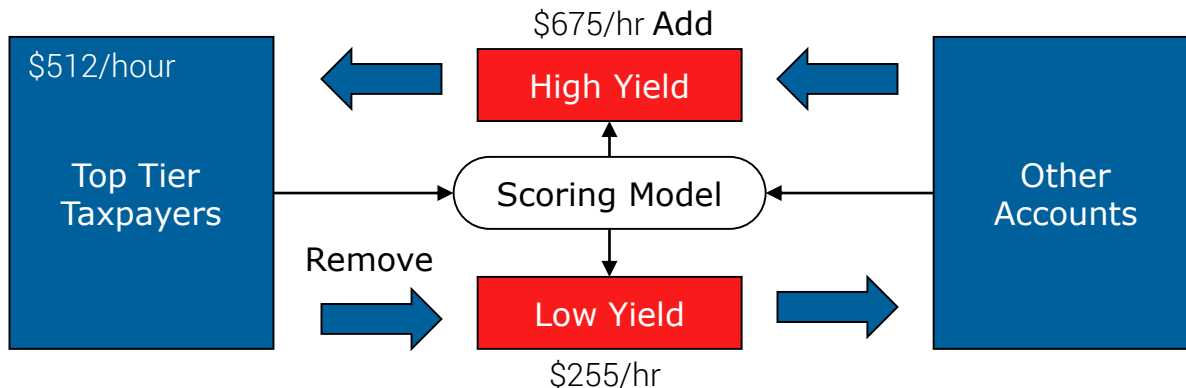
Analytics Opportunities for Audit Selection

Predictive Model

Audit Example

- Most Agencies will audit a "Top 100" or "Top 200" list

- Is #99 is really better than #102?

- Predictive Models can look for other (hidden) factors that suggest a strong assessment

Model Types

- Predictive Models
  - Scoring cases to identify ones similar to previous high performing audits
  - The goal is to provide models scores that support better decision making:
    - Estimated amount of the tax change
    - Estimated amount of the tax change per audit hour
    - Estimated collections from tax changes per audit hour

- Outlier Models
  - Businesses or Individuals whose filings do not look like established norms
  - Ratios of specific fields are unusual
  - Could be an outlier within an industry

- Models supplement (but don't replace) audit experience
  - Audits selected using predictive models increase performance -- give an auditor a good case, and they will collect more money

Desk Audit Matching Programs

- While Non-Filer programs generate significant revenue, they also generate
  - Large workloads
  - Can have high false positive rates
- Often Multiple Goals
  - Maximize revenue
  - Minimize low value leads
  - Maximize value from programs
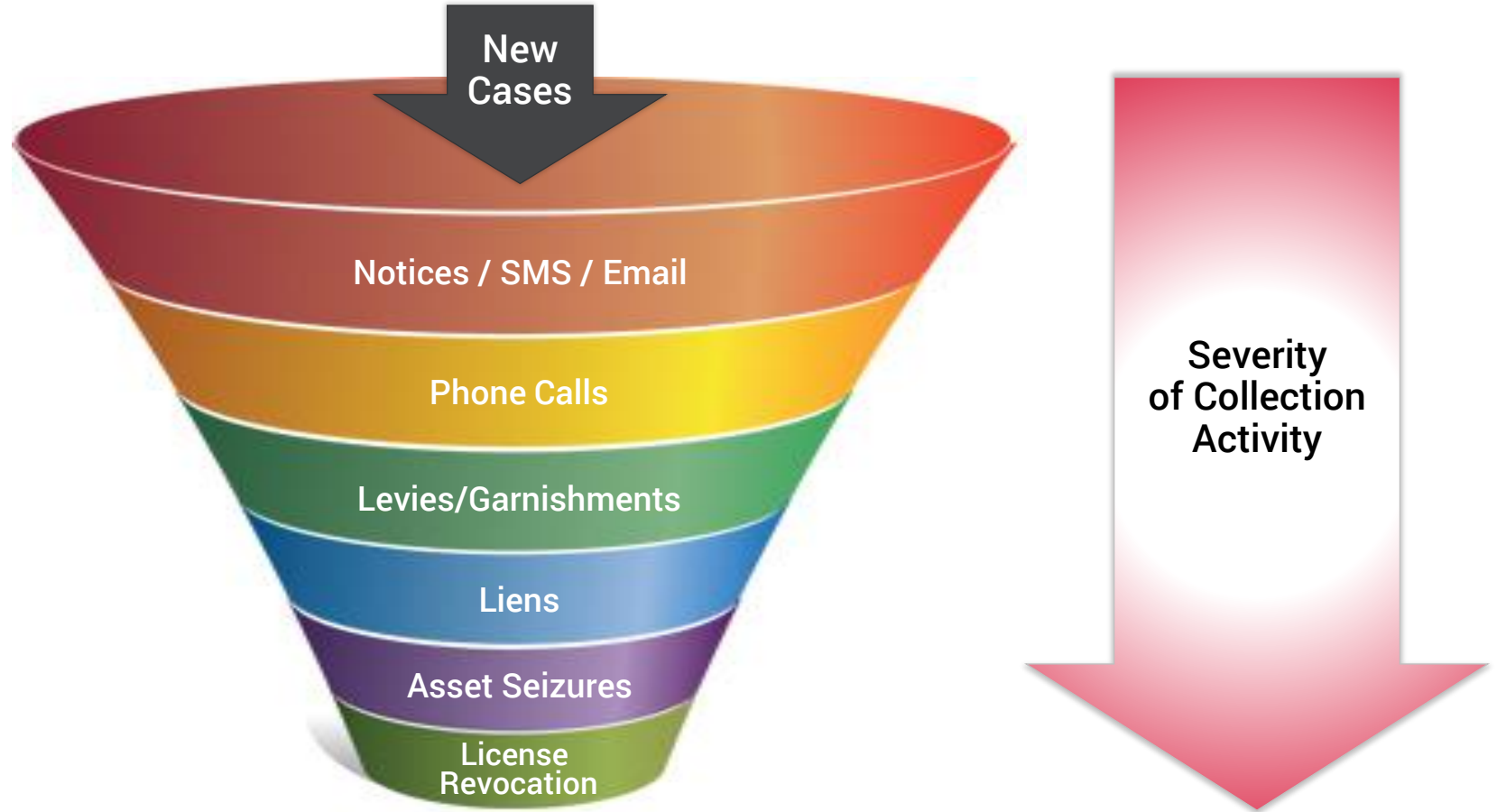- Models can help you balance priorities, and determine the best set of cases to work
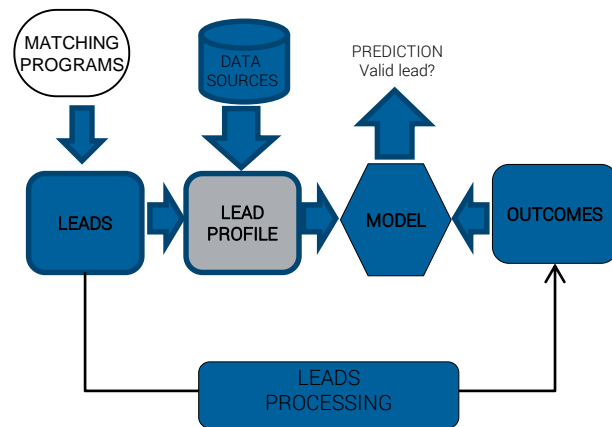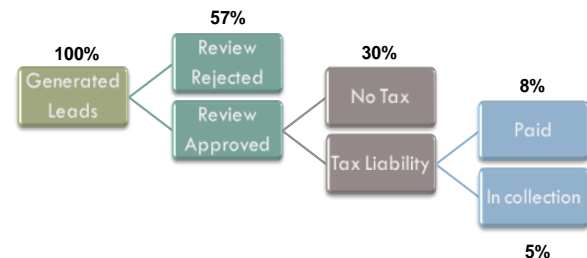
Analytics Opportunities for Collections

- Who would pay if you send only notices

- Who will never pay, no matter the effort or actions

- Who wants to pay, but currently has no funds

- Who will need phone calls or a visit before they will pay

- Who will only pay through involuntary actions

- Who needs a new approach to break their cycle of non-compliance

Identifying the Lowest Cost, Least Intrusive way to Collect

New Cases

Notices / SMS / Email

Phone Calls

Levies/Garnishments

Liens

Asset Seizures

License Revocation

Severity of Collection Activity

Predictive Models: Altering the up-front notice cycle

- Predictive models can determine which cases are most likely to self-cure and which will likely require collector attention
  - Cases likely to self-cure could remain in the notice cycle longer
  - Cases unlikely to self-cure (especially with wage or bank sources) could move to involuntary collections as soon as legally permissible

- Goal:
  - Reduce involuntary actions for taxpayers likely to self-comply
  - Begin stronger collection actions earlier, where needed, to increase the likelihood of success
  - Reduce overall phone calls and intrusion

A view of debtors over time

Remaining Debtors

Will Pay

Might Pay

Can't Pay

Won't Pay

Time
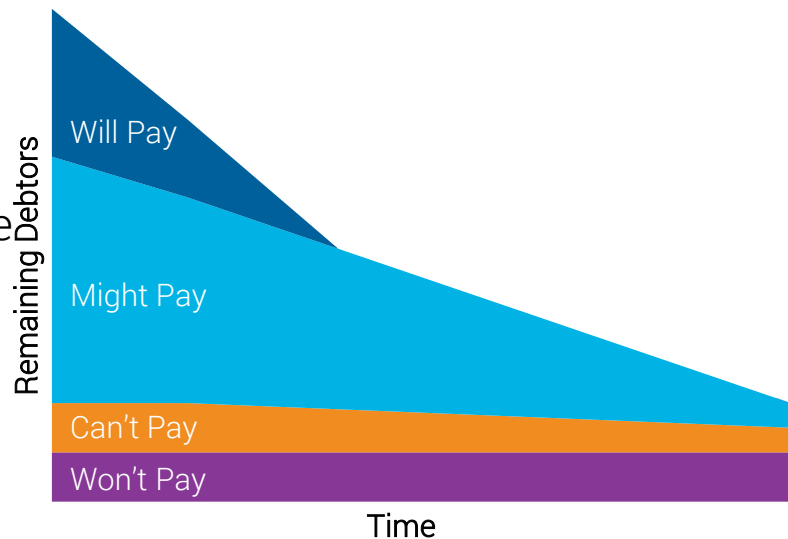
Predictive Models: Which cases to assign to your collectors?

- Cases which are unpaid after automated processes represent a small slice of the overall tax population

- Models need to be trained specifically on this cohort

- While some high dollar cases need to be worked, regardless of model scores, the models can score which case assignments are most likely to increase revenues for the agency

Enhancing your usage of Collection Agencies using Predictive Models

- Commercial debt holders typically have much more sophistication around collection agency management than Government
  - Significant opportunities are available if your agency utilizes collection agencies
- Placement analytics
  - Assign cases to the collection agency most likely to collect a specific debt
- Commission analytics
  - Charge the amount most likely to maximize revenue for the State
- These types of approaches likely will require different contractual terms with your agencies

Optimized Collections: Taking Analytics to the next level

- Optimization allows you to evaluate against all options
  - Evaluates all potential strategies
  - Takes into account staffing and budget constraints

- Evaluates the effect of re-deploying staff between workloads
  - Inbound calls, Outbound calls, Assigned Cases
  - Notice frequency, timings and channels
  - Case assignment strategy

- Optimization allows you to evaluate, prioritize and assign actions based on simultaneous evaluation of multiple outcomes

Analytics Opportunities for Customer Service

Customer Service

- Use analytics to focus your customer service programs

- Predict:
  - Which segment of the population (or which taxpayer) will most benefit from education/outreach?
  - Which taxpayers are most likely to become non-compliant
  - The most effective interaction for each taxpayer/segment

Customer Service

- Measure the effect of your customer Service:
  - Create a control group either from current taxpayers who don't get the customer service intervention, or use taxpayers from prior years as your measurement
  - Determine the impact from different treatment approaches
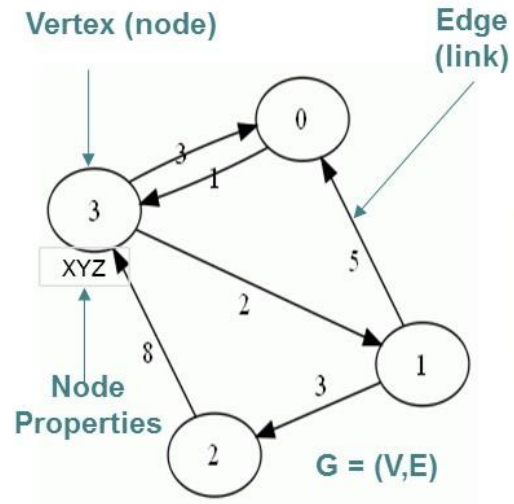 - Determine the effectiveness of different communication channels

Using Network Analytics to identify non-compliance

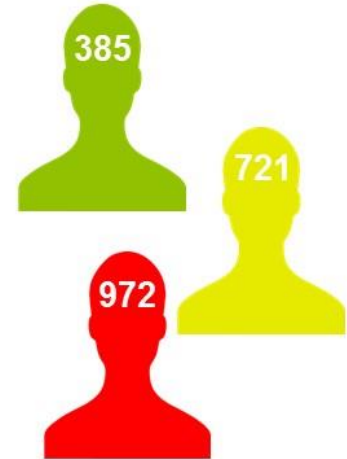# What Is Network Analysis (SNA)?

Analytic approach of correlating **people**, **businesses**, **related parties**, and **events** and the analysis of the resulting networks for risk or opportunity

Application of Graph Theory

Analytics

Predictive Insight

US Department of Homeland Security TSA

Challenge

- The US Government needed a highly scalable solution to vet over 5 million passengers each day

- Each passenger must be checked against a series of watch lists, no fly data, and white lists to determine whether they can fly

Solution

- SNA selected as the searching approach for one of the largest screening programs in the world

- Over 5 Million searches per day with burst rates of over 500 per second

- Searches disparate data in real-time
  - Protected data spread across dozens of geographical / departmental, disparate data sources
  - No PII allowed to leave data source

- Highly accurate – **Keeps Terrorists Off Airplanes**
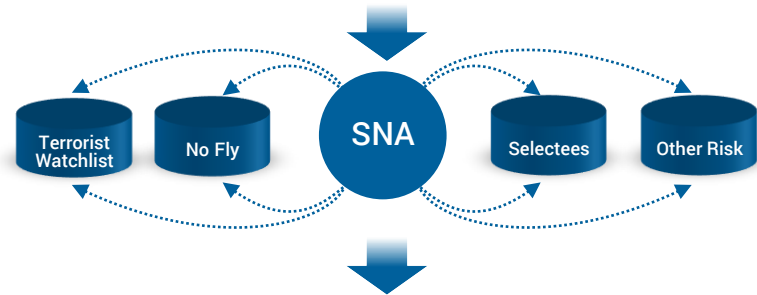
Attribute / Algorithms		I-Score™	
Name	Antonio Calderón	894	Calderon, Toño
Date of Birth	4/22/1970	962	22-Apr-70
Passport	5FETS45-3 *22	778	SFETS45322
Federal ID	123 45 6789	580	*** * 6789
Aggregate IScore		921	

Matches are delivered

Terrorist Watchlist   No Fly   SNA   Selectees   Other Risk

Step One: Who is this individual or business

Attribute/Algorithms	Taxpayer/Registrant	Score	Alternate Data Files
Name	Susan Smith	.894	Suzanne Smyth
Street Address	202 - 3550 Boerne Drive	.938	3550 Bourne St - Apt 202
City, State, Zip	Austin, Texas, 78759	.901	Round Rock, TX 78759-0041
SSN	123 45 6789	.580	*****6789
Telephone Contact	701-555-7878	.900	5557800 Ext 78
Date of Birth	4/22/1970	.962	22-Apr-70
Employer	Triple A Lawn Care	.876	AAA Lawn & Garden
Aggregate Score Match		.921	

- Utilize similarity search algorithms that can be tuned to the nuances of your data and utilizes fuzzy matching

- You will want to be able to tune models up or down during the tax year as you review results

- Can use different confidence scores depending on the use case

Enhanced your Network using Third-Party Data

- Tax agencies are data rich – significant data which others do not have

- However, other State Agencies, and third parties have additional data which can supplement your data
  - Addresses
  - Phone Numbers (including prior phone numbers)
  - Aliases/DBAs
  - Bank Accounts
  - Corporate Information

- Consolidating your data with other sources will provide a more robust picture of the taxpayers you are reviewing
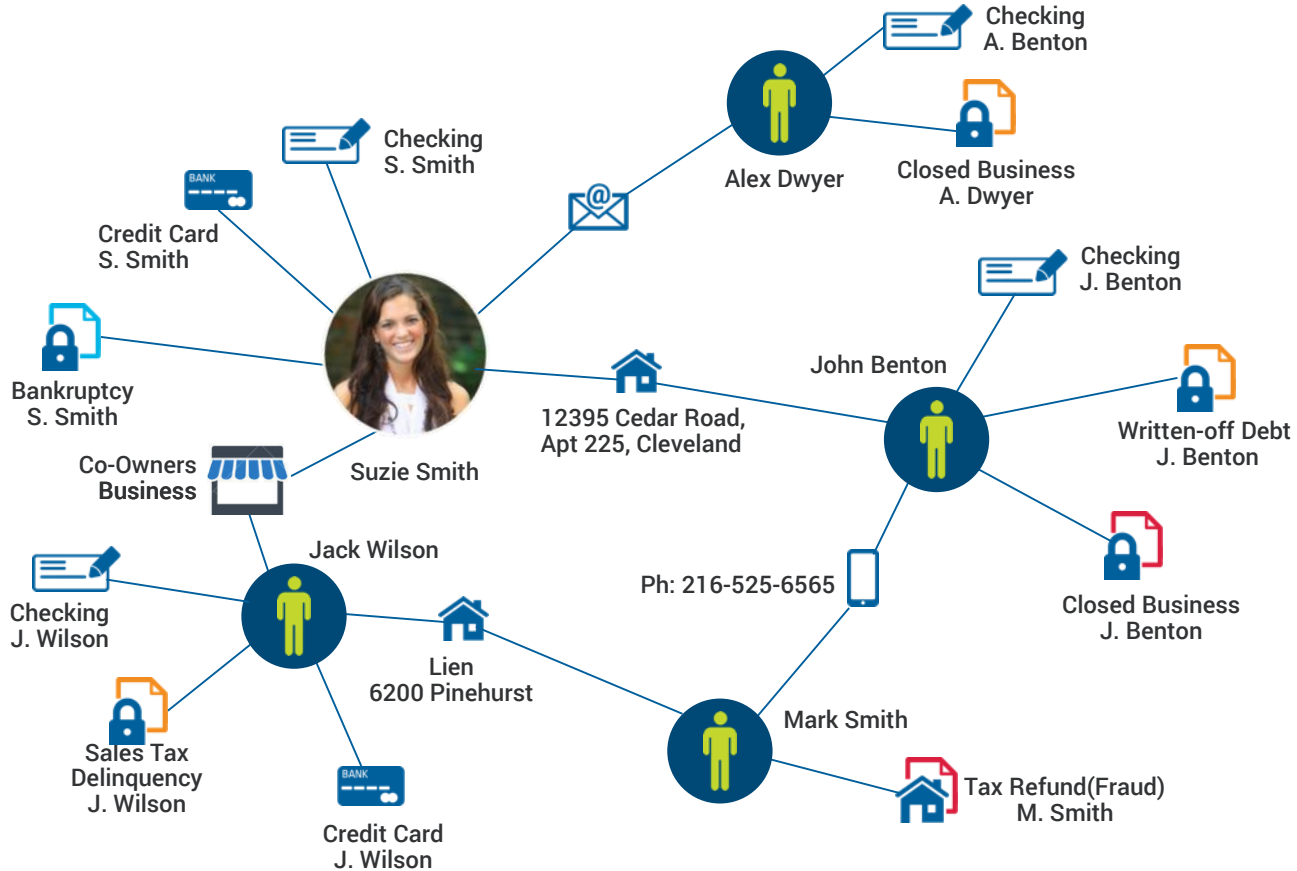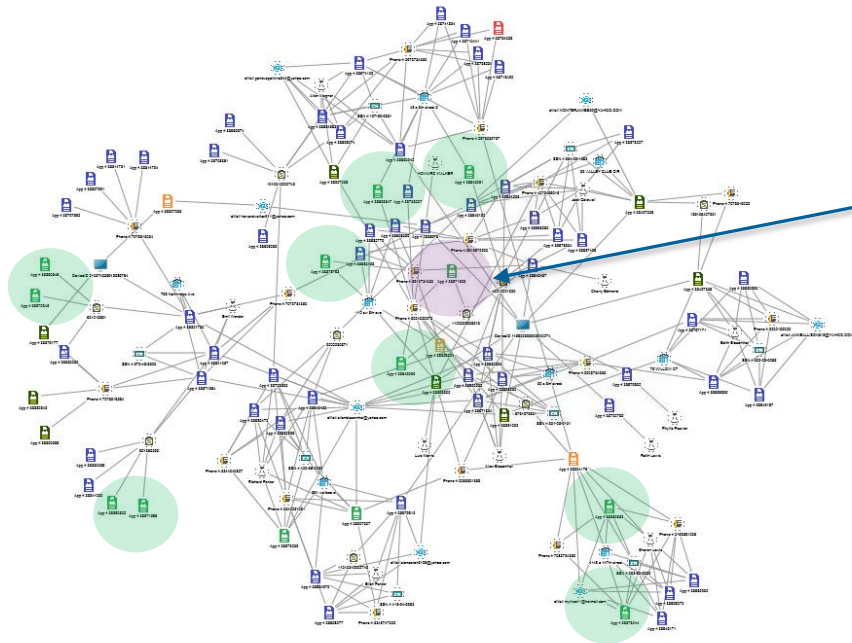
Identifying Potential Non-Compliance using SNA

When you identify one or more entities (individuals or businesses) with compliance issues, the SNA can compare new filings, registrations or taxpayer to find hidden connections
- Refund Fraud
- New Registrations

"This taxpayer is definitely related to the others we previously identified as being problematic. [The] email, phone number and address of the taxpayers in this network are repeatedly shared"

Refund Fraud

- Many refund fraud requests have significant similarities between each other

- SNA can be used to score the proximity of a filer to previously refund fraud cases

- SNA can also look for an unusual velocity of related taxpayers

- This can supplement your refund fraud detection program

Find Businesses that are Associated with Problematic Businesses

- A longstanding challenge for tax agencies is closed businesses re-opening, but still effectively the same business
  - Similar business in the same location
  - Similar business in a new location
  - New business in the same location
- Agencies rarely have the manpower to review all new registrations
  - Score cases for nearness to previously closed businesses
  - Automatically identify candidates, saving time and resources
- This approach can be used to find successor businesses and transferee liabilities

FICO

About the Presenter

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- 25 Years working exclusively with Federal, State and Local government agencies

- Experience with more than 20 different tax agencies worldwide

- Skilled in enhancing collections, audit and fraud systems, and business processes

- Experience with Predictive Modeling and Behavioral Science techniques to enhance collections

FICO Overview

Profile	The leader in analytic solutions for risk management, fraud, and customer engagement Founded: 1956 NYSE: FICO Revenues: $839 million (fiscal 2015)
Products and Services	Pioneers at transforming Data into insights to help organizations achieve their mission FICO® Score and other models for making decisions 130+ patents in analytic and decision management technology, with an additional 90+ patents pending Analytic applications for collections, fraud, customer service and cybersecurity
Clients and Markets	10,000+ clients in 90+ countries Industry focus: Banking, government, insurance, retail, health care
Recent Rankings	#1 in services operations analytics (IDC)* #4 in worldwide analytics software (IDC)* #8 in Business Intelligence, CPM and Analytic Applications (Gartner)** #26 in the FinTech 100 (*American Banker*)
Offices	20+ offices worldwide, HQ in San Jose, California 2,900 employees Regional Hubs: New York, San Diego, Fairfax, London, Birmingham (UK), Johannesburg, Milan, Moscow, Munich, Madrid, Istanbul, Sao Paulo, Bangalore, Beijing, Singapore

*IDC, *Worldwide Business Analytics Software 2013-2017 Forecast and Vendor Shares*, June 2013.
**Gartner, *Market Share Analysis: Business intelligence, Analytics and Performance Management, 2012,Dan* Sommer & Bhavish Sood, May 7, 2013.

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