



Finding the Hidden Connection:

Enhancing Compliance Programs using Social Network Analysis

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# The “Phoenix” Convenience Store



- Owner: S Smith 4 LLC
- Address: 649 Main Street
- DBA: 649 Convenience
- Taxes Owed
- Business License Revoked



- Owner: S Smith 5 LLC
- Address: 649 Main Street
- DBA: Phoenix Convenience
- Same Phone Number
- Registration Received: This Morning

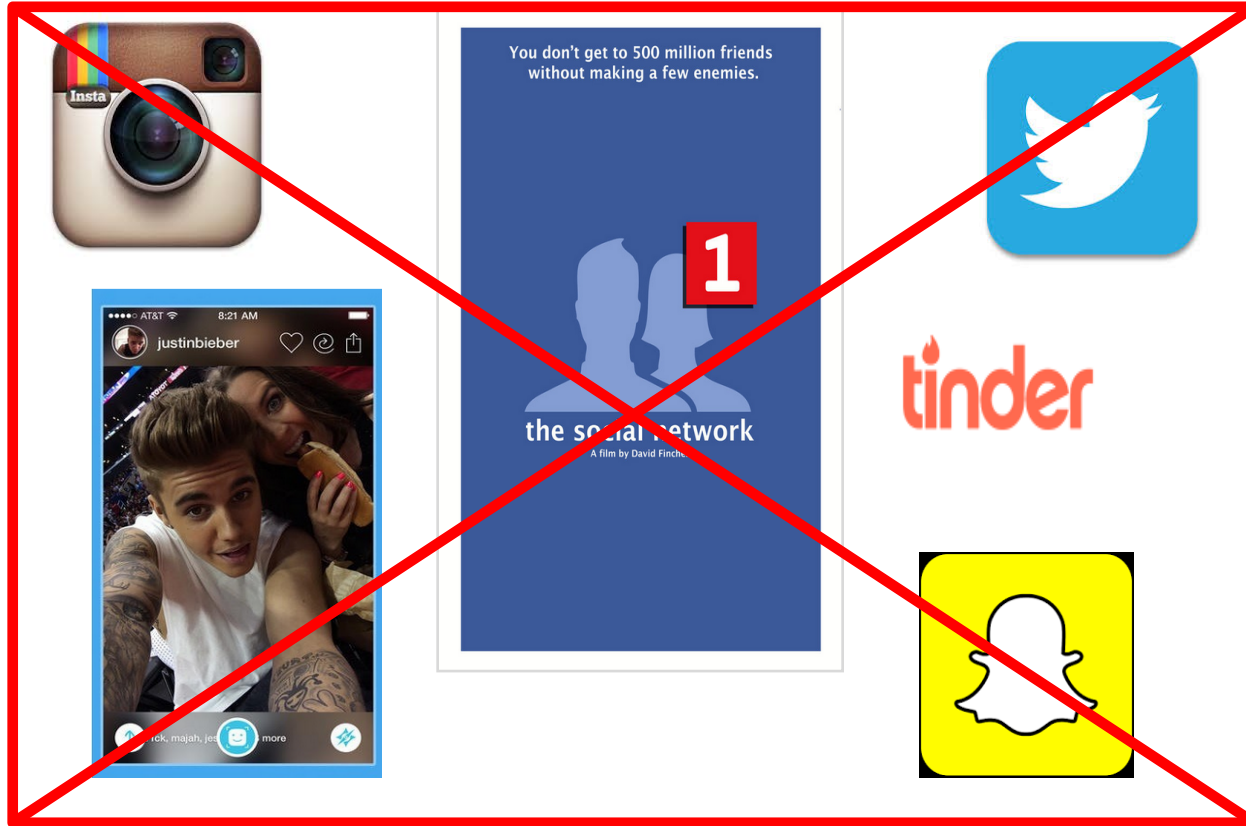
A man in a white shirt and tie is working on a laptop. The image is partially visible on the left side of the slide.

## Agenda

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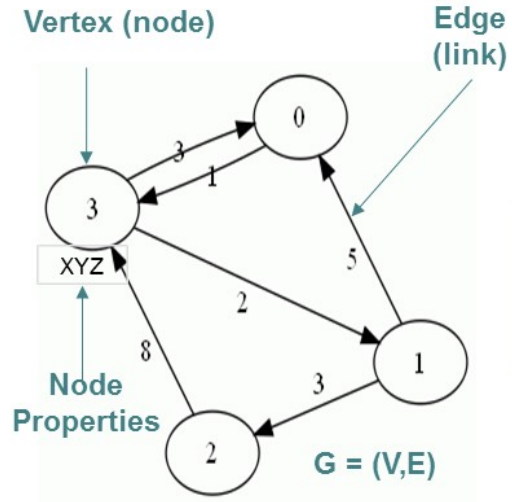
- Social Network Analysis Explained
- Combining your data with third-party data
- Opportunities for Tax Agencies
- Questions

# What Is Social Network Analysis (SNA)?



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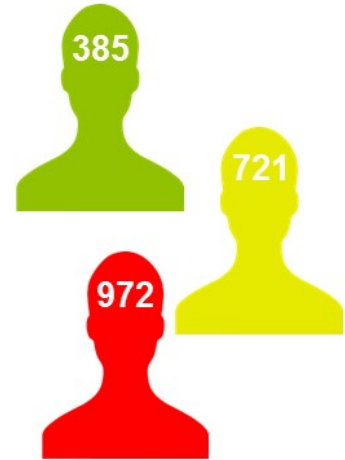
Analytic approach of correlating people, businesses, related parties, and events and the analysis of the resulting networks for risk or opportunity



Application of Graph Theory



Analytics



Predictive Insight

# Examples of SNA in Action



Calculate Domain and Page Strength



Marketing – Householding, upsell, ads, etc.



Organized Fraud Analytics

# Transportation Security Administration (TSA): Secure Flight



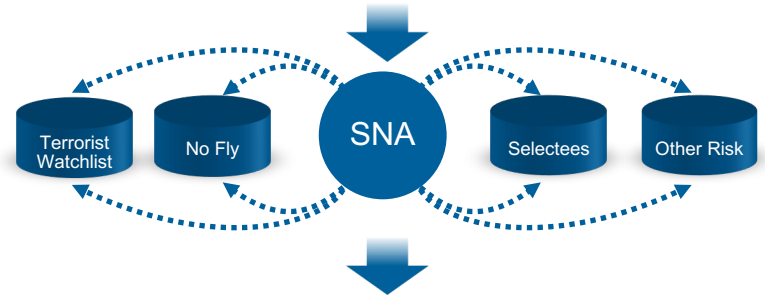
## US Department of Homeland Security TSA

### 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

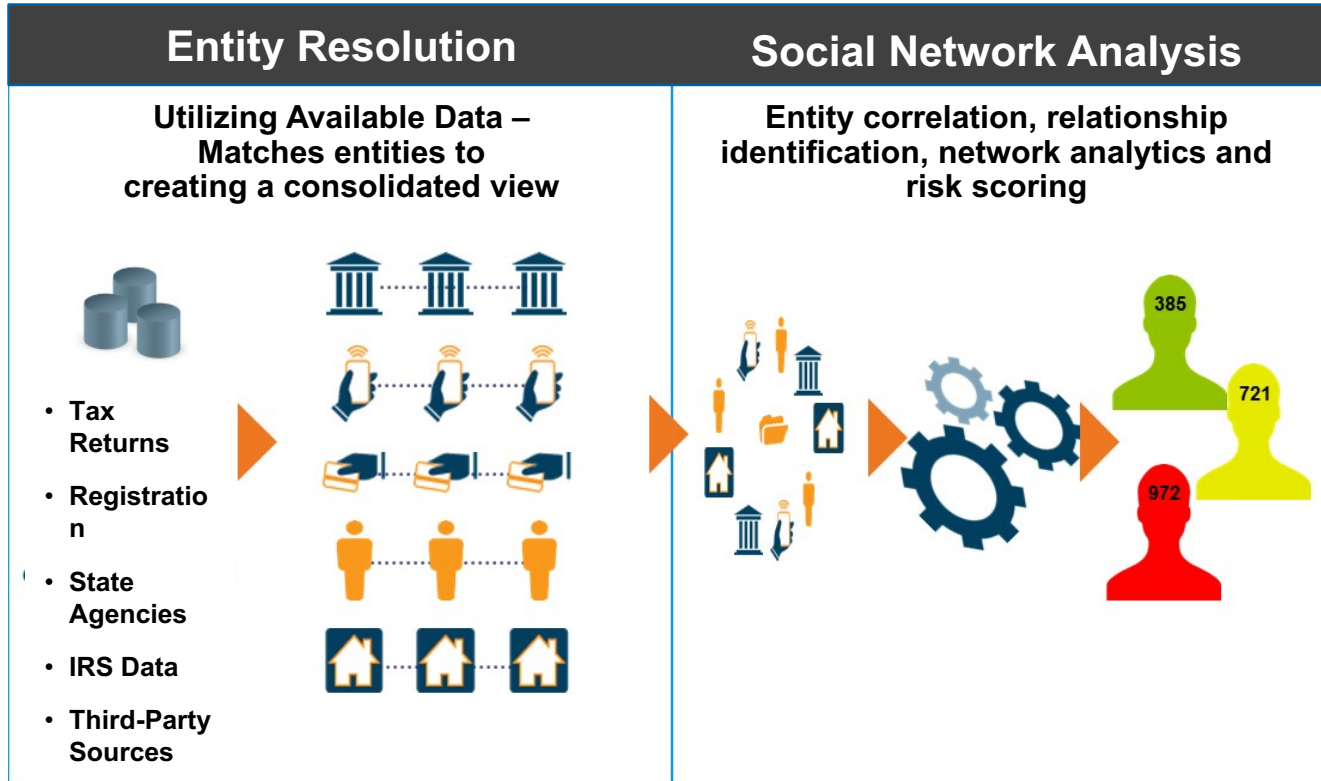
- SNA selected as the searching approach for one of the largest screening programs in the world
- Over 5 Million searches per day with burst rates of over 500 per second
- Searches disparate data in real-time
  - Protected data spread across dozens of geographical / departmental, disparate data sources
  - 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

# What Happens Behind the Scenes





# Characteristics of Data Used in Identity Resolution

## Personally Identifying Information (PII)

- Name, DOB, SSN, address, phone number, email, online logins, device ID, IP address account numbers and more
- Use Tax Information
- Use Third-Party Information
  - Other Agencies
  - Data Providers

- Establish true identities: “who’s who”
- Discover hidden relationships/networks: “who knows whom”

## Current and Historical Data Across Disparate Sources

- Internal
  - Registration Information
  - Hotlists / Watchlists
  - Known Fraud Lists
- Third Party
  - IRS or other government sources
  - Subscription Based; e.g., Lexis Nexis, D&B, Experian



# How Identity Resolution Works

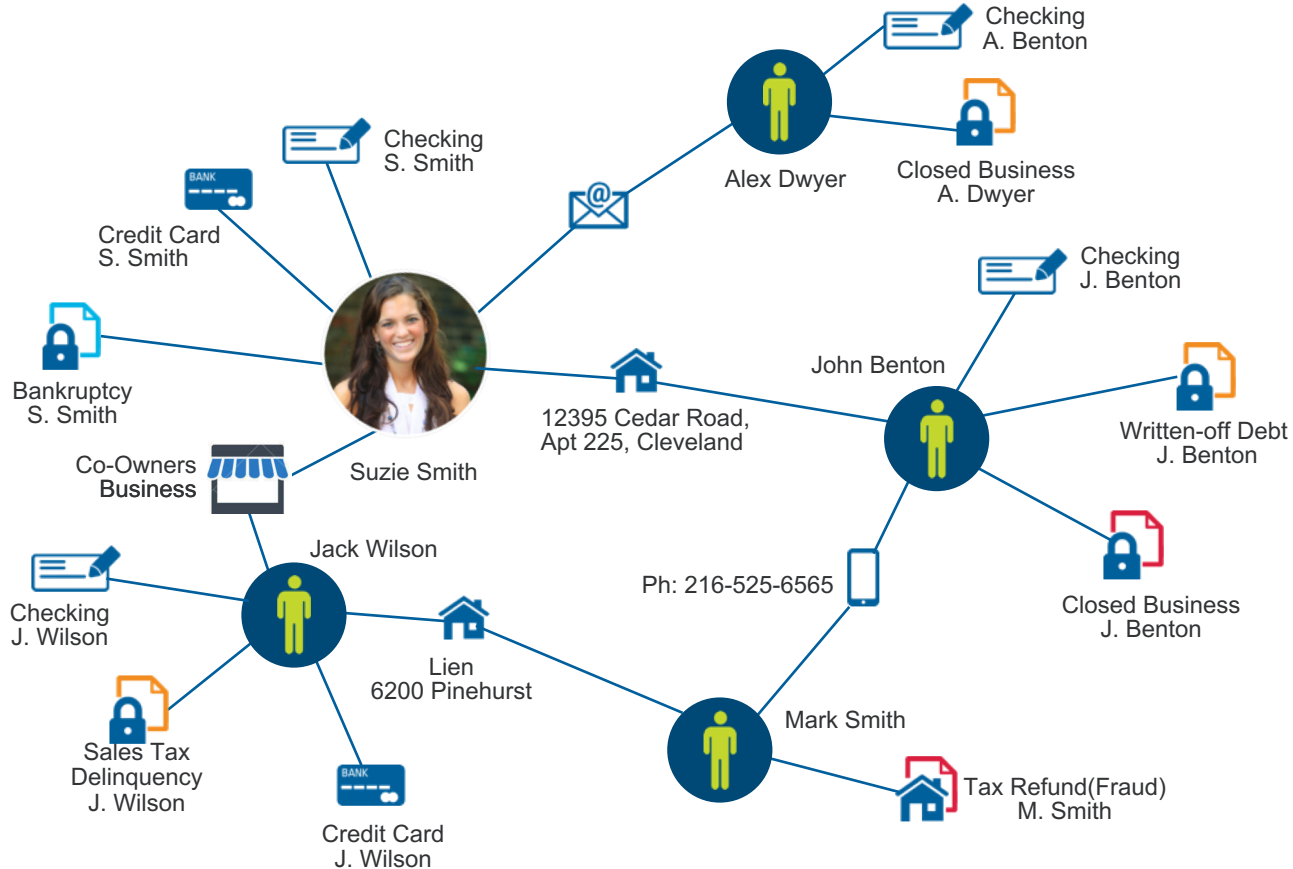
Attribute/Algorithms	Taxpayer/Registrant	Score	Akternate Data Files
Name	Susan Smith	.894	Suzanne Smyth
Street Address	202 - 3550 Boerne Drive	.938	3550 Bourne St - Apt 202
City, State, Zip	Austin, Texas, 78759	.901	Round Rock, TX 78759-0041
SSN	123 45 6789	.580	*****6789
Telephone Contact	701-555-7878	.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

# Consolidating Tax Data with 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
- Marrying your data with other data will provide a very robust picture of the taxpayers you are reviewing

# Moving from Identity Resolution to Building a Social Network



# Why is Social Network Analysis Effective?

## Cost to Obtain Alternate Identities

- Valid identity info (phone numbers, addresses, etc.) must be obtained and managed

## Physical Limitations

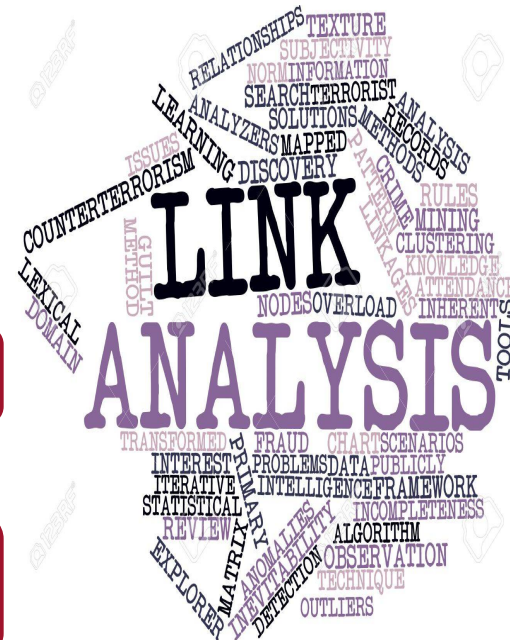
- People are limited to how many cell phones they can carry with them or number of addresses that they can have access to

## Mental and Practical Limitations

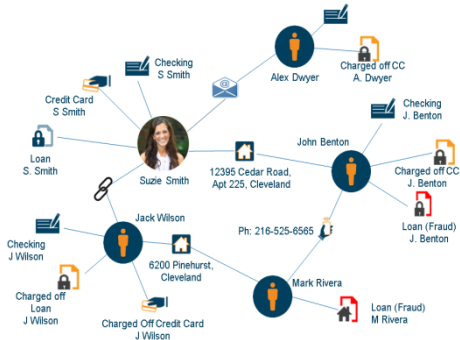
- There are only so many fictitious details a person can remember

Re-use or recycling of information

Relationships between seemingly unconnected data can be found



# Creating an SNA Score for Proactive Fraud Detection



Social Network



Variable	Value
Count of participants	5
Count of tax issues	6
Count of confirmed fraud	1
Account velocity	12.56
# connections to investigations	1
	...

Network Variables



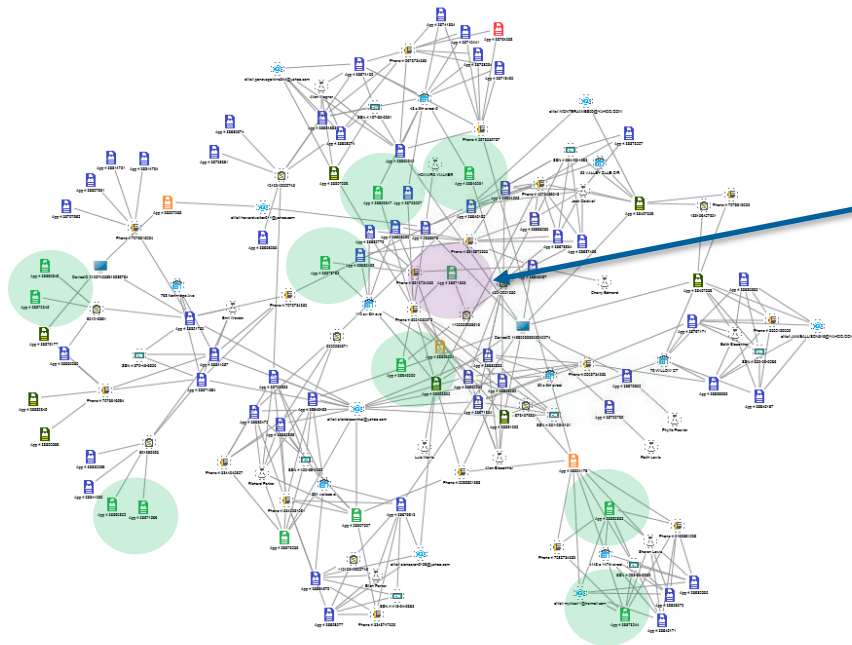
Analytic Result	Risk Score
Risky transactions	+ 163
High velocity of charge-offs within the network	+ 131
High velocity of suspect claims within the network	+ 220
1 open investigation on the network	+ 180

Predictable Insight

# 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

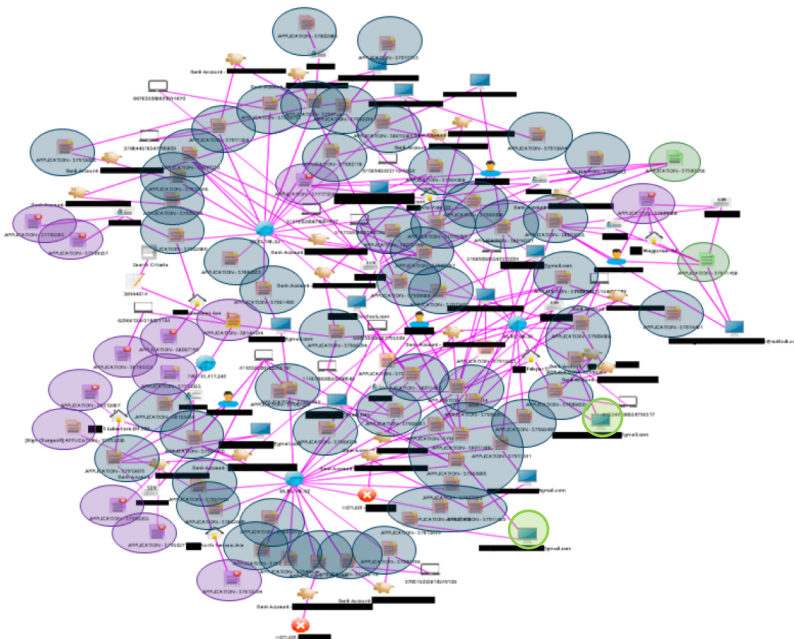
- Refund Fraud
- New Registrations



“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”

## Example 2: Turning a Four Day Investigation into a 10 Minute Review

- 30 customers known to be part of a fraud ring (blue)
- Through link analysis:
  - Additional customers (purple) are identified by an SNA tool to be related to this ring
  - Including additional accounts which weren't previously identified (green)







# Opportunities for Tax Agencies

# Finding Successor 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



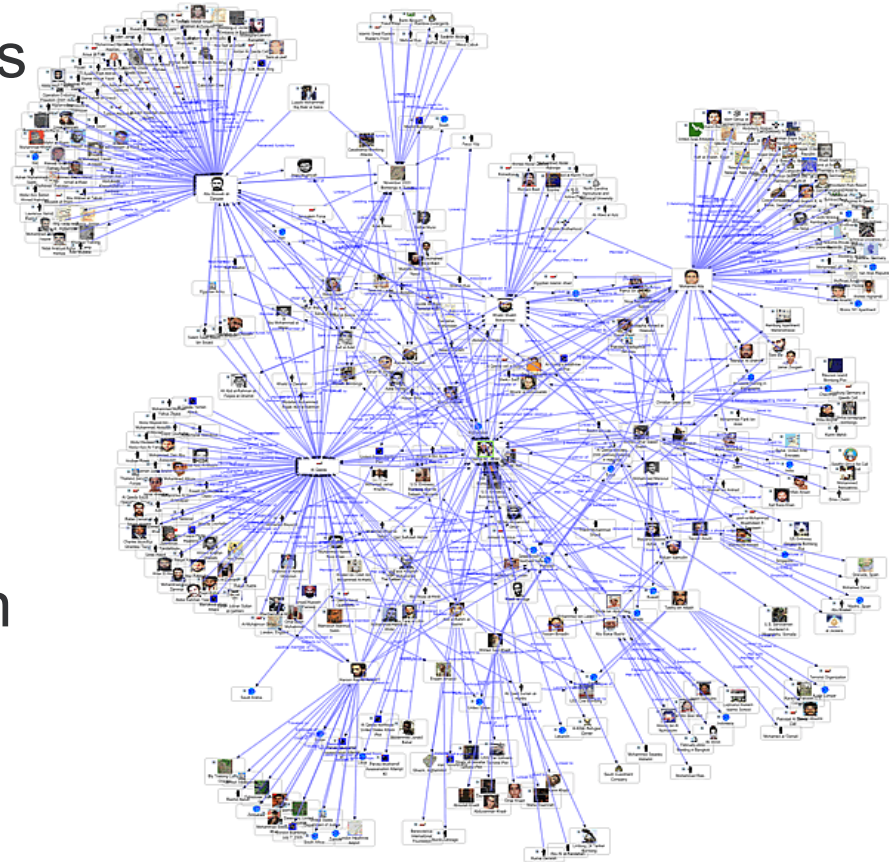
# Refund Fraud

- SNA can be used to score the proximity of a filer to previously refund fraud cases
- While it isn't the solution by itself, this provides a great addition to your refund fraud program
- Many refund fraud requests have significant similarities between each other



# Find Businesses that are Associated with Problematic Businesses

- Score businesses or individuals based on nearness to others with known issues
- Can match on address, phone number, bank accounts, employers, virtually any data field
- Can be used for audit selection or as an investigatory tool



# Skip Tracing

- Supplement existing third-party data sources
- Quickly find entities with shared demographics
- Can prioritize based on the amount of overlap
- More useful than next-door neighbors



# FICO Overview

<b>Profile</b>	<p>The leader in analytic solutions for risk management, fraud, and customer engagement          Founded: 1956          NYSE: FICO          Revenues: \$932 million (fiscal 2018)</p>
<b>Products and Services</b>	<p>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</p>
<b>Clients and Markets</b>	<p>10,000+ clients in 90+ countries          Industry focus: Banking, government, insurance, retail, health care</p>
<b>Recent Rankings</b>	<p>#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 (<i>American Banker</i>)</p>
<b>Offices</b>	<p>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</p>

\*IDC, *Worldwide Business Analytics Software 2013-2018 Forecast and Vendor Shares*, June 2013.

\*\*Gartner, *Market Share Analysis: Business intelligence, Analytics and Performance Management, 2012*, Dan Sommer & Bhavish Sood, May 7, 2013.

# About the Presenter



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- 25 Years working 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

Thank you

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