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
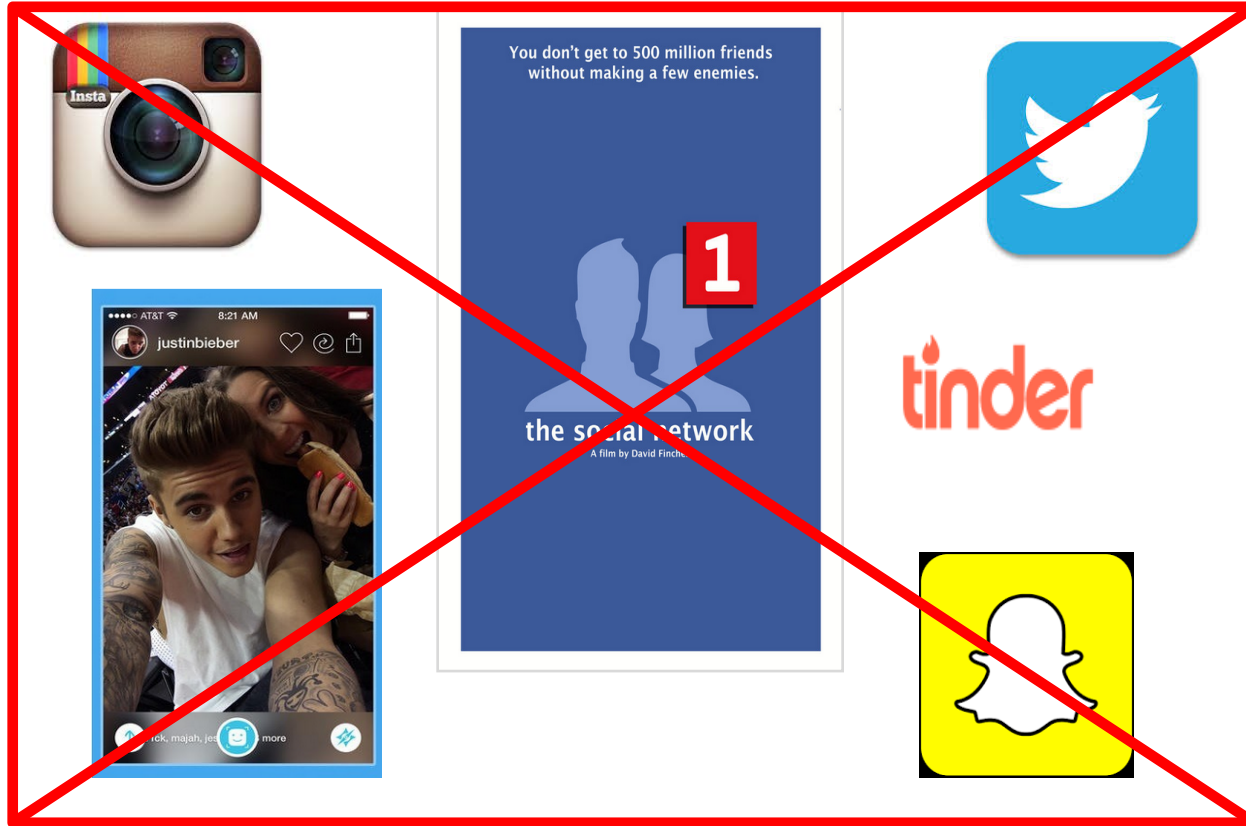- Same Phone Number
- Registration Received: This Morning

Agenda

- Social Network Analysis Explained

- Combining your data with third-party data

- Opportunities for Tax Agencies

- Questions

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What Is Social Network Analysis (SNA)?

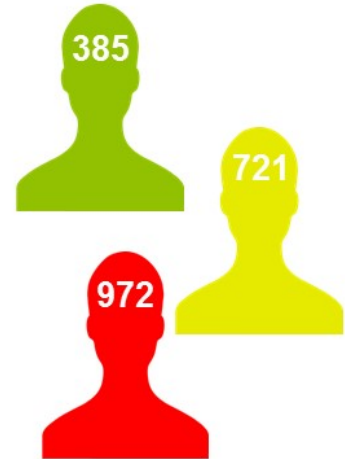# What Is Social Network Analysis (SNA)?

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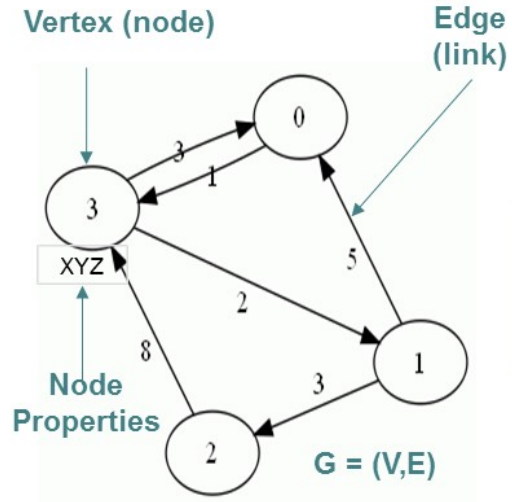
Application of Graph Theory

Analytics

Predictive Insight

Examples of SNA in Action

Calculate Domain and Page Strength

Marketing – Householding, upsell, ads, etc.

Organized Fraud Analytics

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# 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
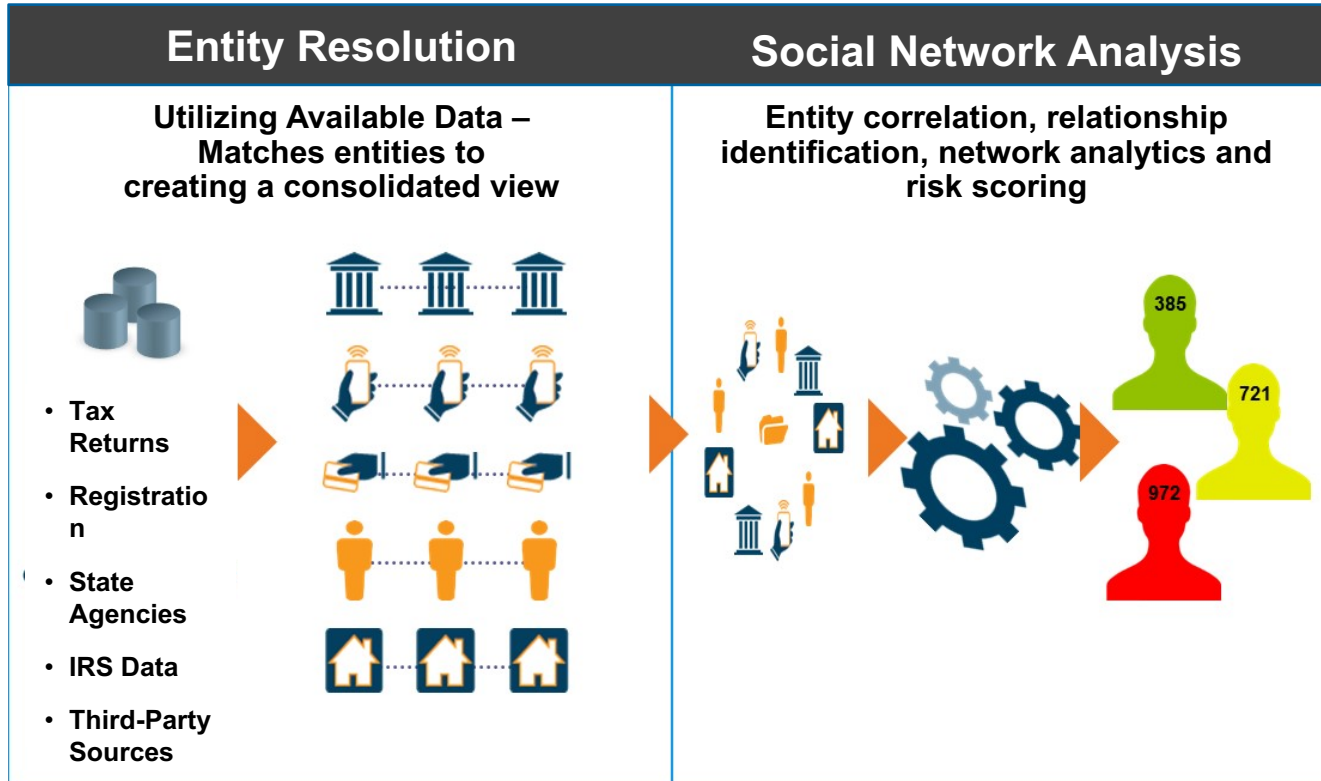
Solution

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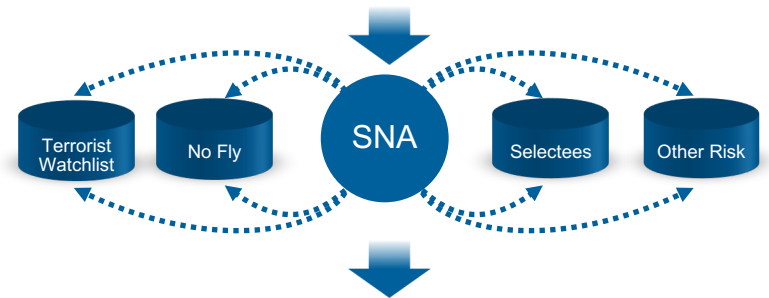
Attribute / Algorithms		I-Score™	
Name	Antonio Calderón	894	Calderon, Toño
Date of Birth	4/22/1970	962	22-Apr-70
Passport	5FETS45-3 *22	778	SFETS45322
Federal ID	123 45 6789	580	*** ** 6789
Aggregate IScore		921	

Matches are delivered

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What Happens Behind the Scenes

Entity Resolution

Utilizing Available Data – Matches entities to creating a consolidated view

- Tax Returns
- Registration
- State Agencies
- IRS Data
- Third-Party Sources

Social Network Analysis

Entity correlation, relationship identification, network analytics and risk scoring

385
721
972

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

Current and Historical Data Across Disparate Sources

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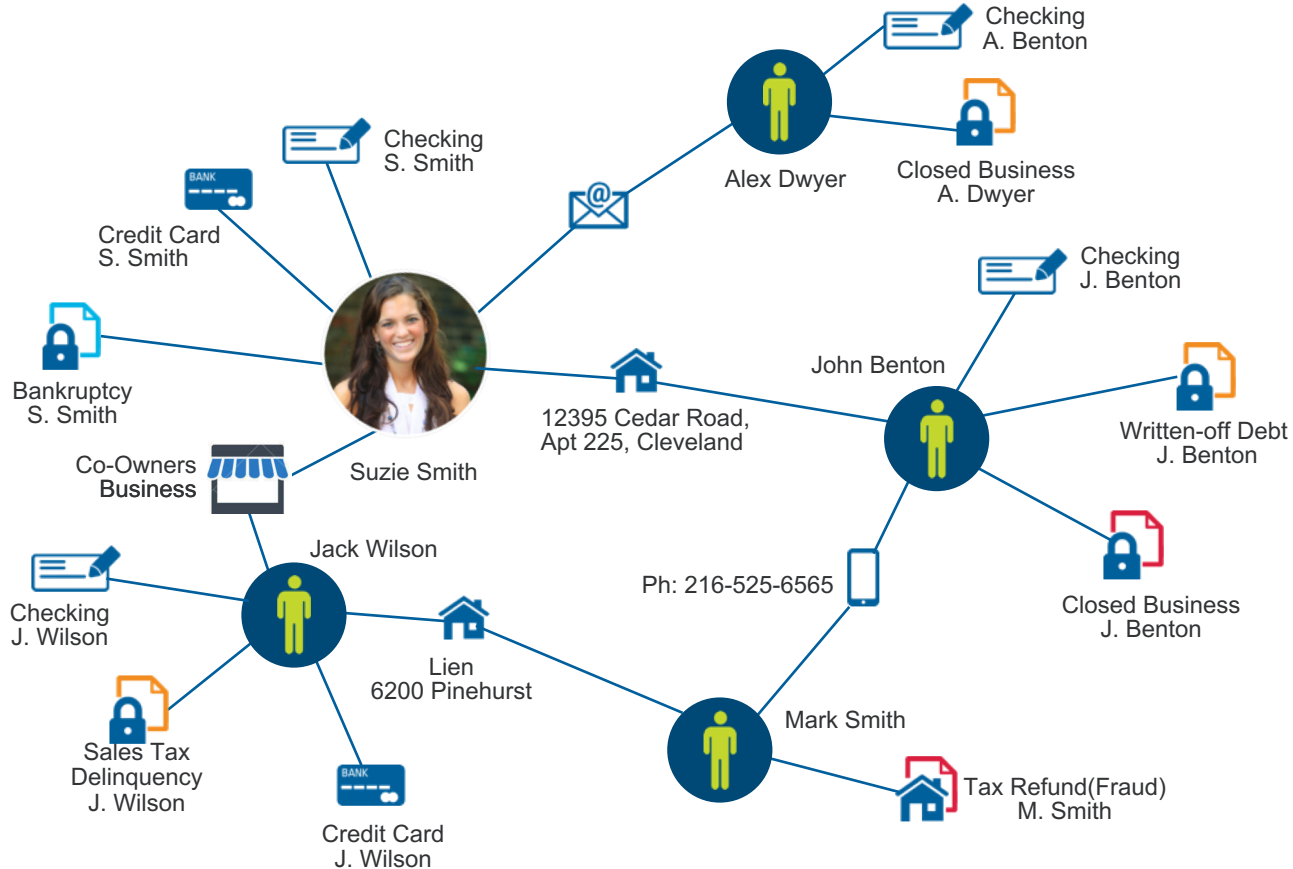 - Subscription Based; e.g., Lexis Nexis, D&B, Experian

- Establish true identities: "who's who"
- Discover hidden relationships/networks: "who knows whom"

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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

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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

Checking
A. Benton

Alex Dwyer

Closed Business
A. Dwyer

Checking
S. Smith

Credit Card
S. Smith

Bankruptcy
S. Smith

Co-Owners
Business

Suzie Smith

12395 Cedar Road,
Apt 225, Cleveland

John Benton

Checking
J. Benton

Written-off Debt
J. Benton

Closed Business
J. Benton

Ph: 216-525-6565

Jack Wilson

Checking
J. Wilson

Sales Tax
Delinquency
J. Wilson

Credit Card
J. Wilson

Lien
6200 Pinehurst

Mark Smith

Tax Refund(Fraud)
M. Smith

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Why is Social Network Analysis Effective?

| Cost to Obtain Alternate Identities	Physical Limitations	Mental and Practical Limitations
• Valid identity info (phone numbers, addresses, etc.) must be obtained and managed	• People are limited to how many cell phones they can carry with them or number of addresses that they can have access to	• 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

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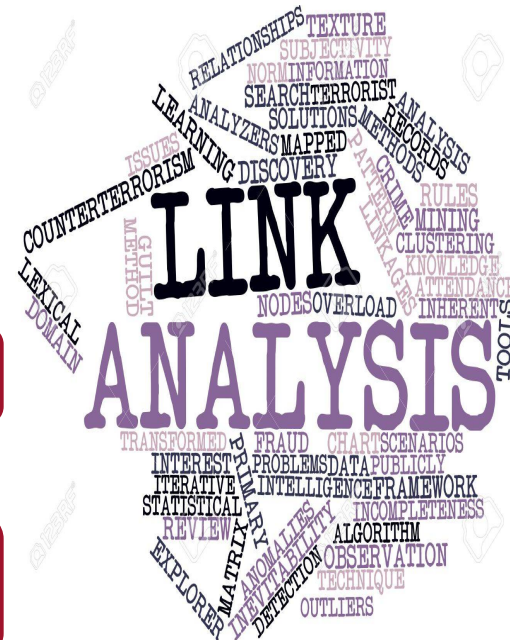
Creating an SNA Score for Proactive Fraud Detection
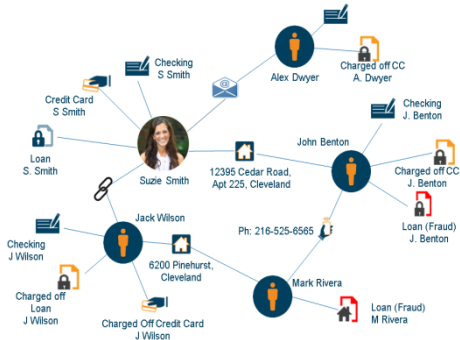
Variable	Value
Count of participants	5
Count of tax issues	6
Count of confirmed fraud	1
Account velocity	12.56
# connections to investigations	1
	…

| 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

Social Network

Network Variables

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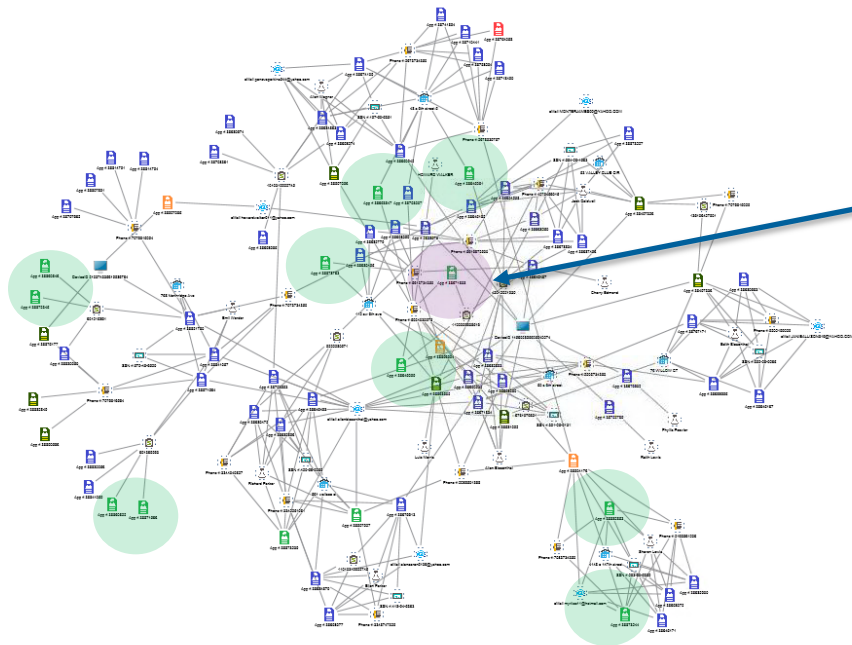
"This taxpayer is definitely related to the others we previously identified as being problematic. [The] email, phone number and address of the taxpayers in this network are repeatedly shared"

- 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)
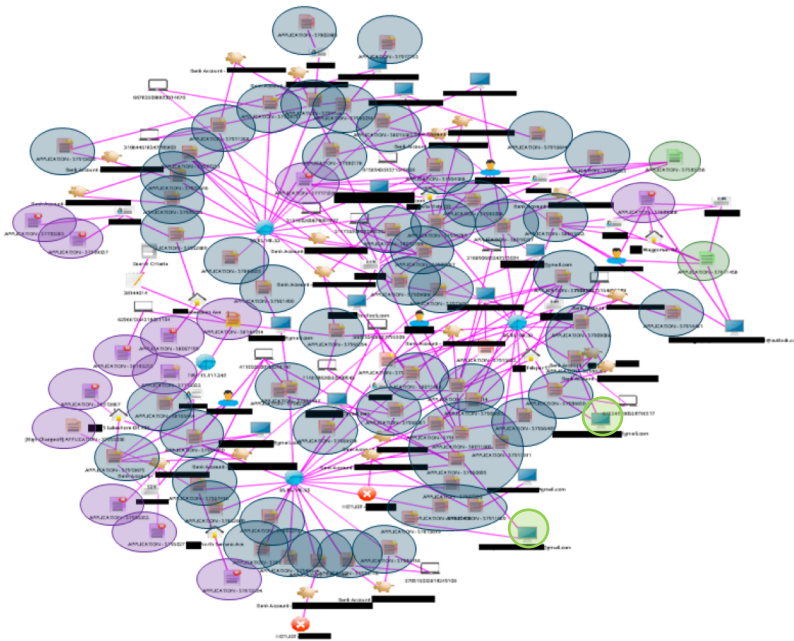
Opportunities for Tax Agencies

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
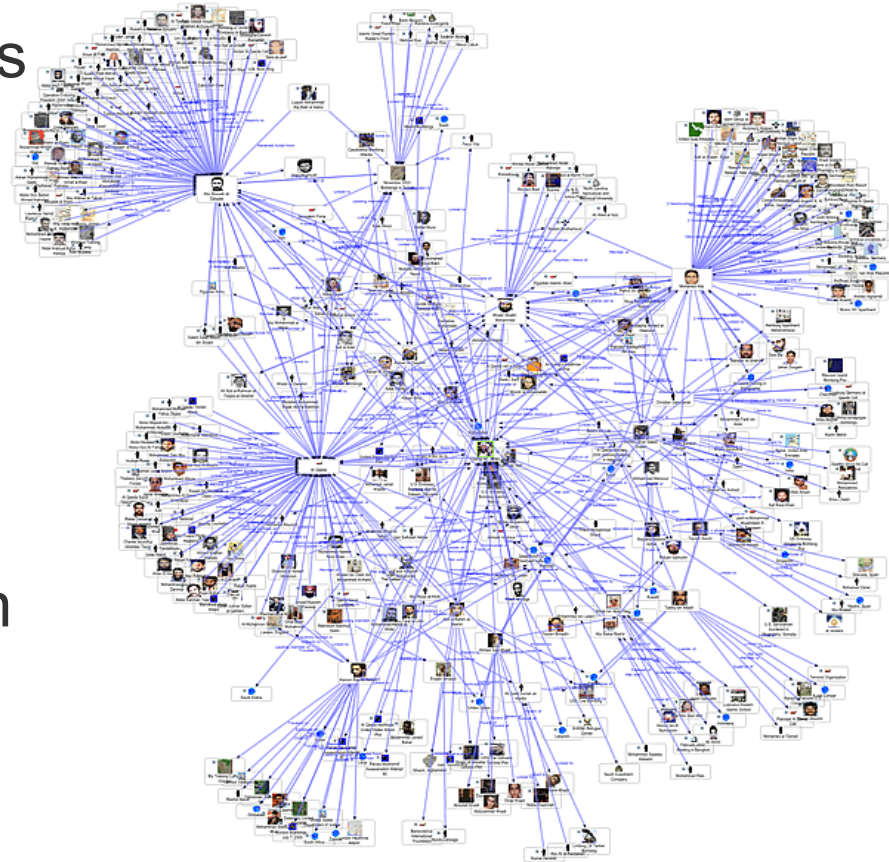
Skip Tracing

- 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

Profile	The leader in analytic solutions for risk management, fraud, and customer engagement Founded: 1956 NYSE: FICO Revenues: $932 million (fiscal 2018)
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 2013-2018 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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