INDUSTRY DAY

Fraud, Waste, and Abuse Use Case

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- Bill Niehaus at Net Owl
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- Ransom Winder at MITRE

Use Cases

Fraud, Waste, and Abuse - Government employees, contractors, and citizens receive reimbursements for travel from federal agencies each year. Was there a requested reimbursement for a patient cancelled appointment, or a no-show appointment?

reservists in connection with a scheme that amounted to $870,000 in fraudulent expenses being filed between August 2007 and September 2009

https://www.irs.gov/pub/foia/ig/ci/LAFO-2013-11.pdf

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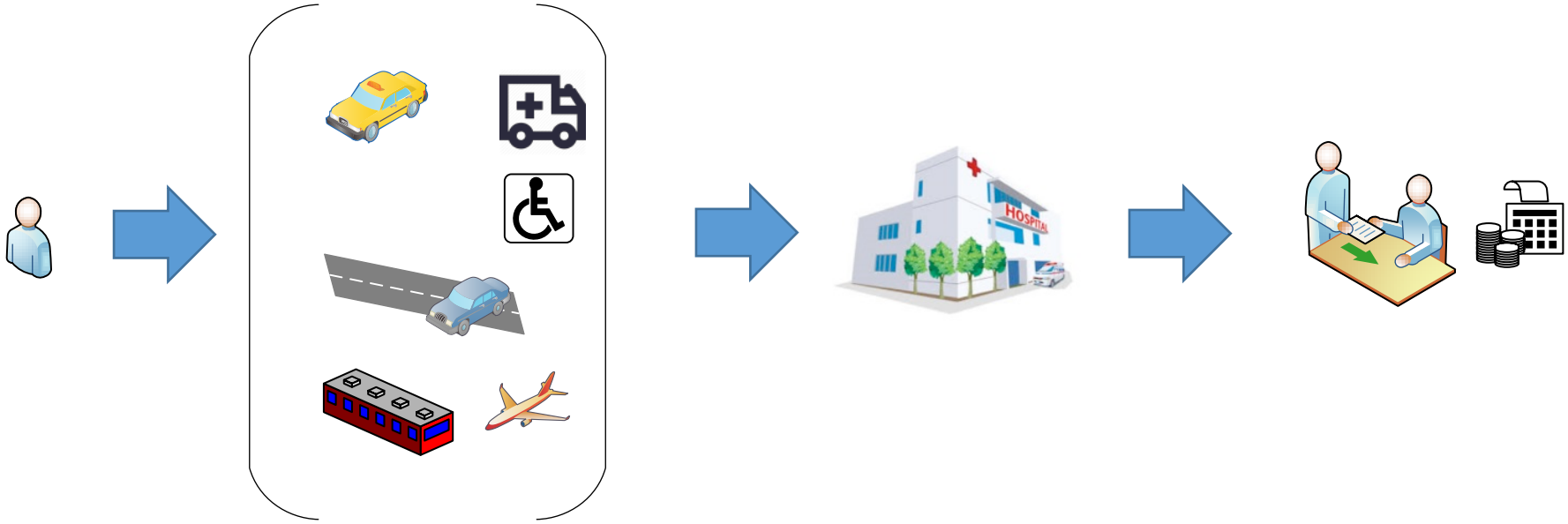
Analytic Technology™ Industry Roundtable

"While improper payments estimates are not a measure of fraud, a lack of sufficient supporting documentation may mask the true causes of improper payments—including fraud.

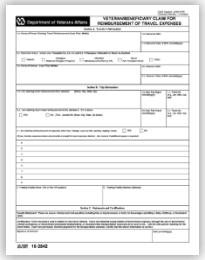
When payments lack the appropriate supporting documentation, their validity cannot be determined. It is possible that these payments were for valid purposes, but it is also possible that the lack of documentation could conceal fraudulent activities."

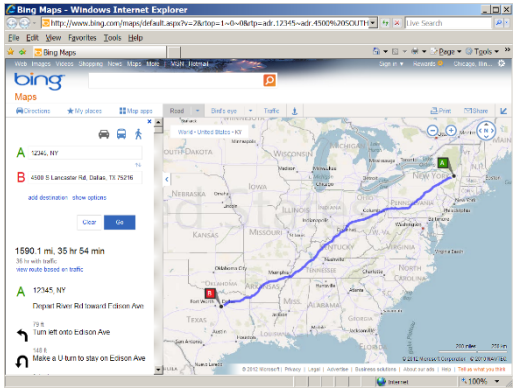
(GAO-17-631T, Report and testimony before the Committee on the Budget, U.S. Senate, May 2017)

Travel Voucher Process



Sources of Documentation





Beneficiary Level

- paper/electronic claim for reimbursement of travel
- travel/claims history (address verification)
- 3rd party entity validation (SSN, name, address, phone)
- travel/transportation receipts

Claimant Level

- Electronic Funds Transfer
- Entity validation (name, address, phone)

Services/Other Level

- transportation services
- services offered by nearby facilities, hours of operation
- relationships (i.e., subordinate approves travel vouchers for superior)

AE's Ontology Details

Stored in Web Ontology Language (OWL)

Upper/Mid Levels use Suggested Upper Merged Ontology (SUMO)

Domain Level is AE specific

Superstructure crosses use cases

- Only subsets of the overall ontology are relevant (and necessary) to each use case

Example entities (*upper-level ontology*)

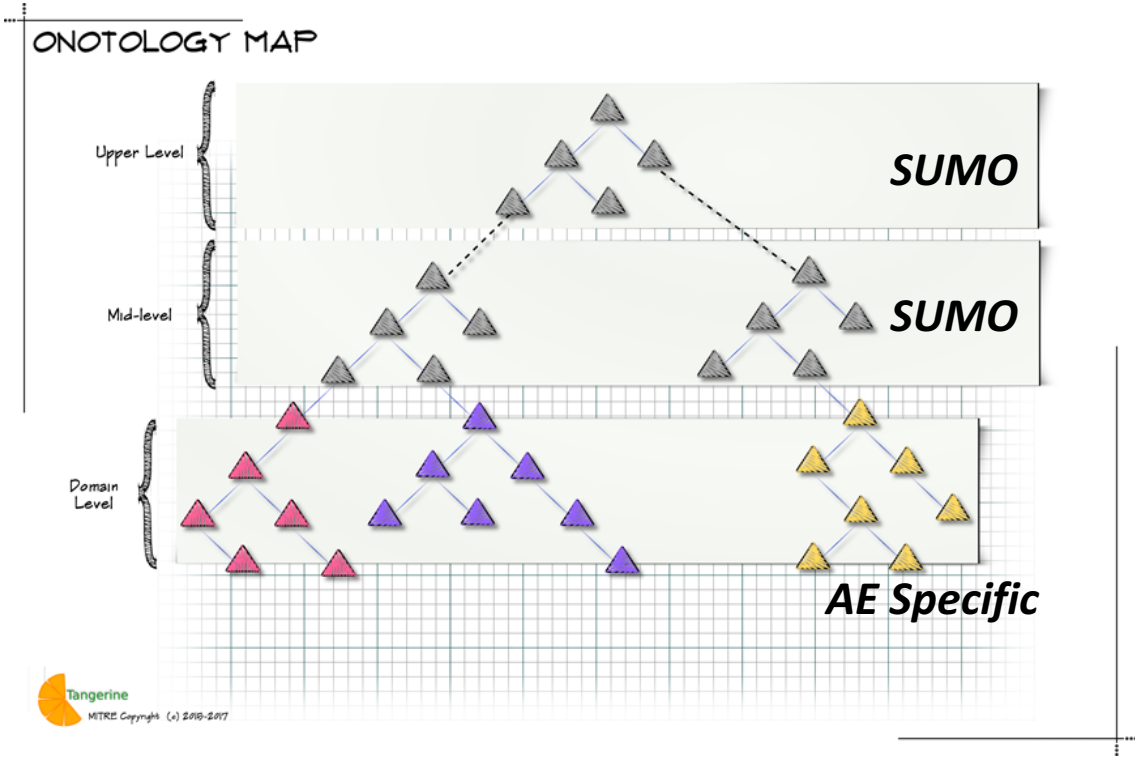
- Agent, Artifact, Identifier

Example entities (*mid-level ontology*)

- Human, Organization, Building, Addresses, etc.

Example domain entities (*domain ontology*)

- ContentBearingObject → Text → Voucher



Analysis Tool to Analysis Tool

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      <entity id=3, imsi=1010, imie=1111/>
      <entity id=4, imsi=9999, imie=2345/>
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            location=57.454,2.14 />
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            location=57.223,2.56 />
    </links>
</network>
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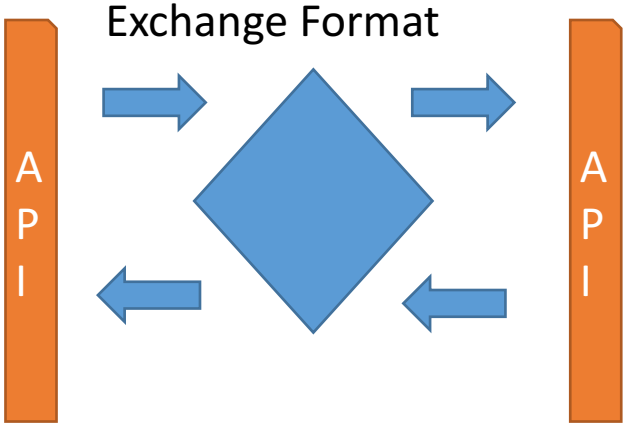
Exchange Format

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    </links>
</map>
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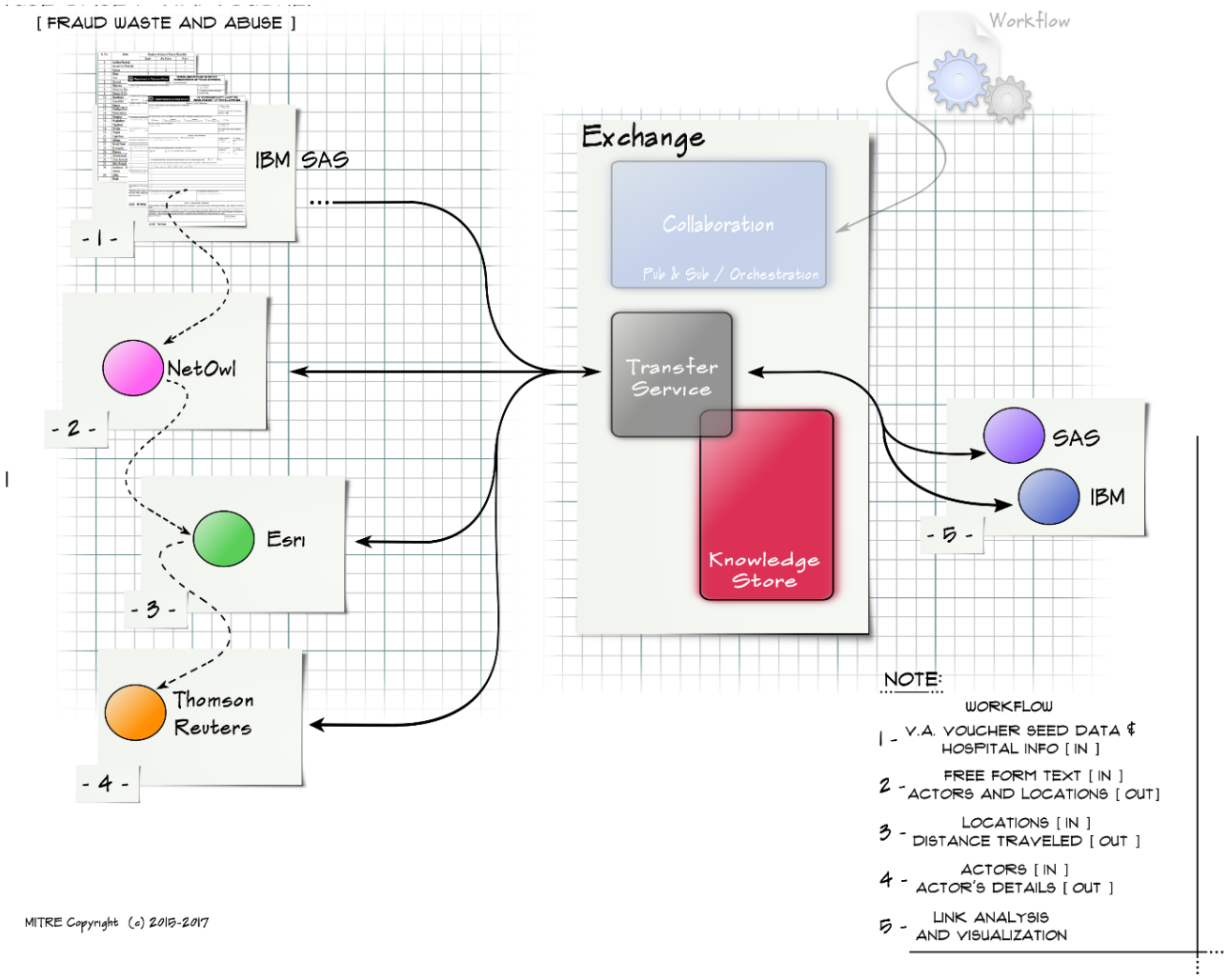
Fraud Use Case Overview



Analytics using SAS Visual Statistics:

Explore and prepare data, interactively create and refine descriptive and predictive models.

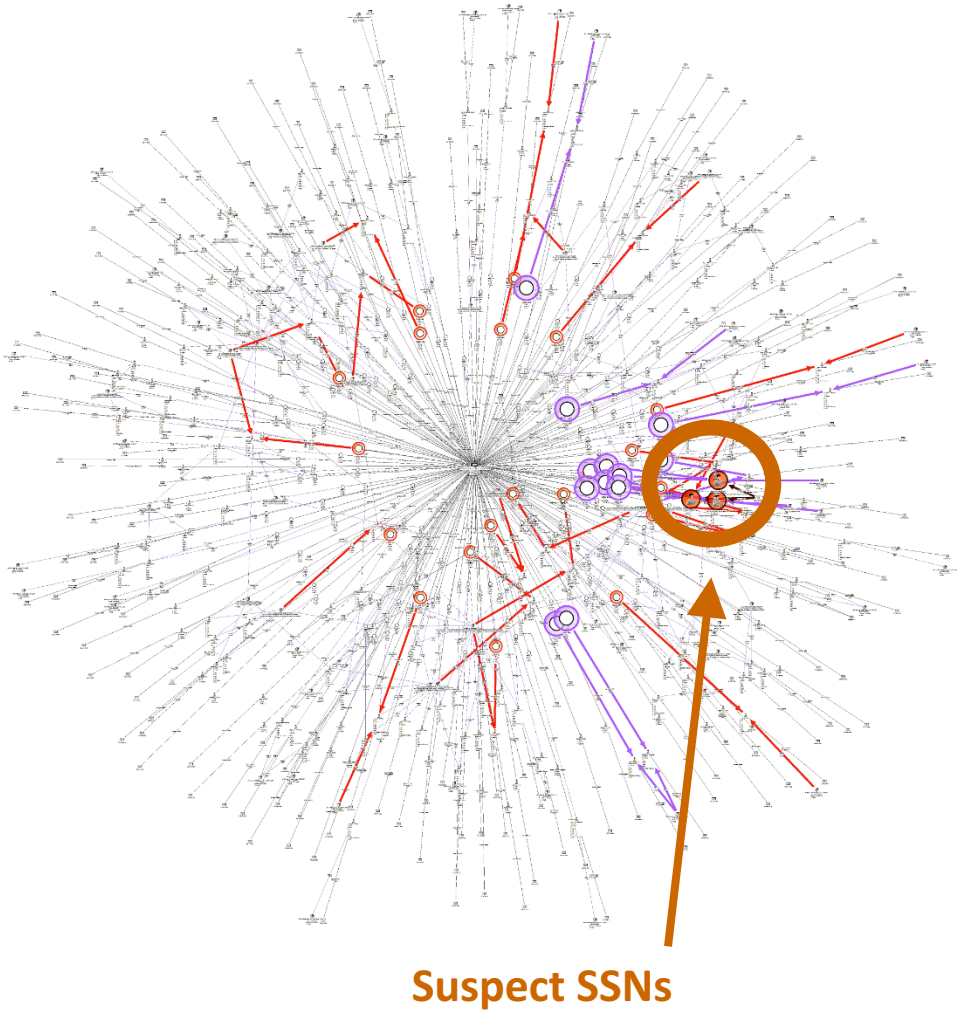
Scenarios for Analysis

- **Outlier detection using peer group analysis of expense estimates given same geographic location for traveling from and to same facilities of care**
- **Peer group "type of care" destination facility likelihood given to and from distances, contrasted with closest facility of care**
- **Probability estimates of expense amount given claimed distances (i.e., probability is low when mileage is low and much higher when mileage implies an overnight stay or toll based upon ESRI routing)**
- **Likelihood estimates of treatment facilities**
- **Weighted estimates of risk given one or more indicators of risk from Thomson Reuters data enrichment.**
- **Outlier detection using anomaly detection**

Analyst Notebook:
Initial view

- Typical Link Analysis “haystack”

- Highlighted trips in purple that bypassed nearer treatment facilities (based on SAS score)
- Highlighted trips in orange that had unexpected tolls (based on SAS score)
- Highlighted individuals with suspect SSNS in brown (based on SAS score)

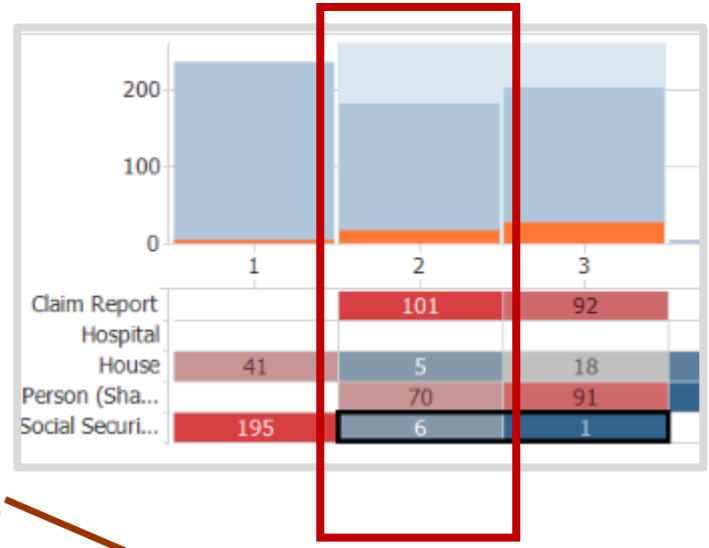


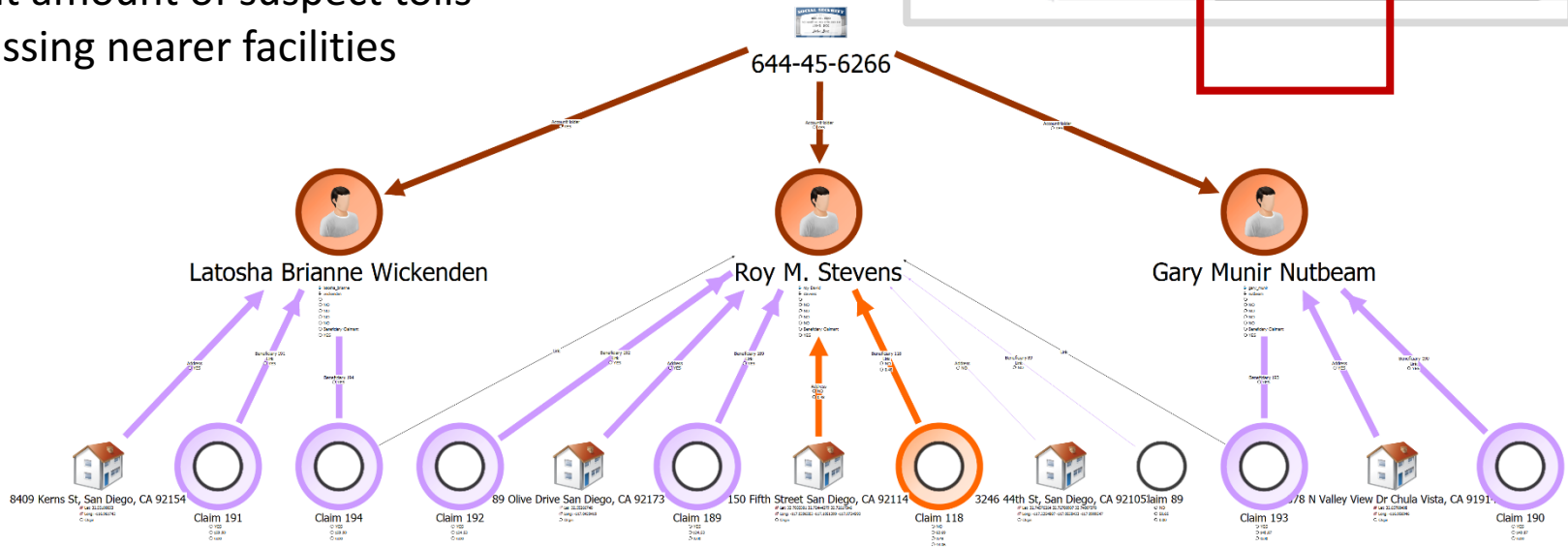
ANB heat map analysis identified additional suspect SSNs (SSN linked to more than one person) ….

Analyst Notebook

Focus on Individuals with Suspect SSN

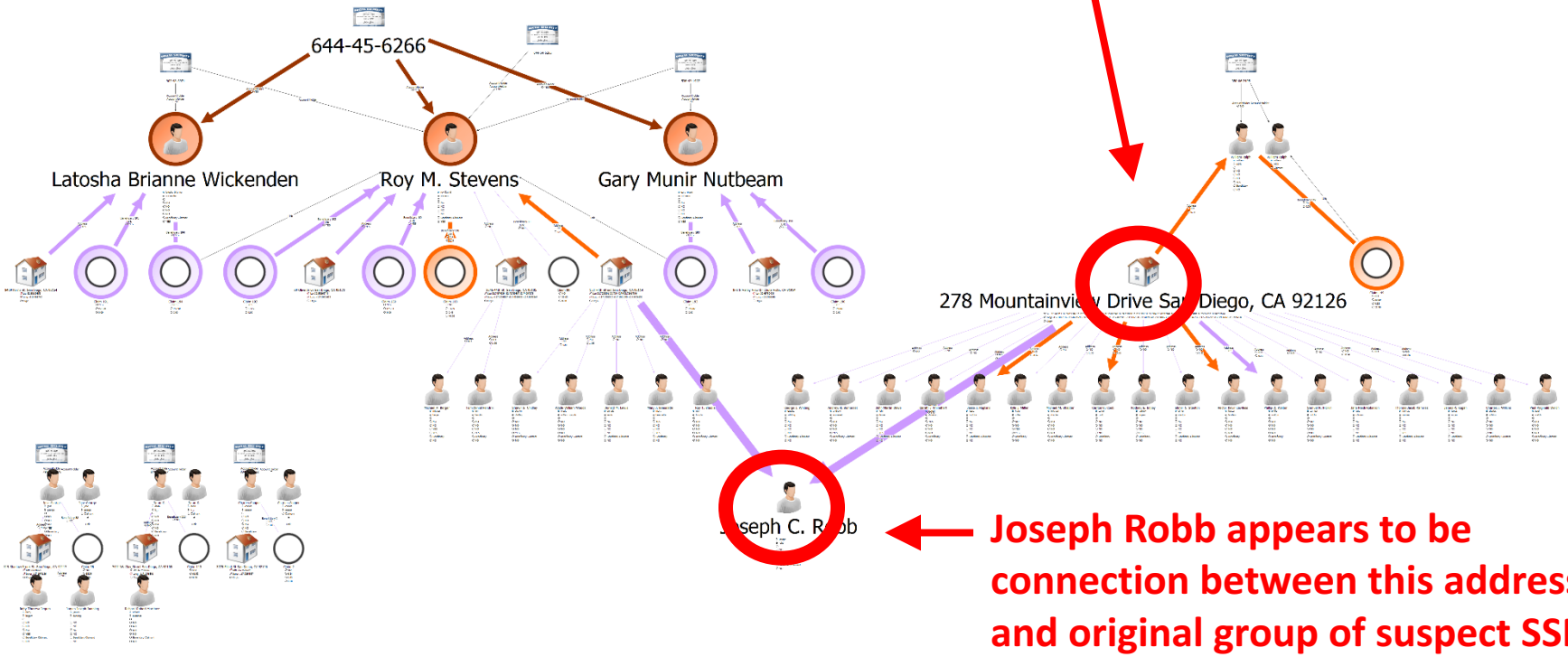
Individuals all using same SSN, significant amount of suspect tolls and bypassing nearer facilities





Analyst Notebook

Extended network of suspect travel vouchers



Same home address shared by 20 individuals

Joseph Robb appears to be connection between this address and original group of suspect SSNs

THANK YOU!

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