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Money-rity Report: Using Intelligence to Predict the Next Payment Card Fraud Victims

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Who We Are?

Terbium labs is a dark web intelligence company made up of an elite group of information security professionals with expertise in everything from cryptography to large-scale information systems.

The Royal Bank of Canada is the largest bank in Canada, and one of the largest in the world (by market capitalization).

Vanguard Cybersecurity Research is a group within RBC with the mission to perform cutting edge research into future cybersecurity threats and innovations.

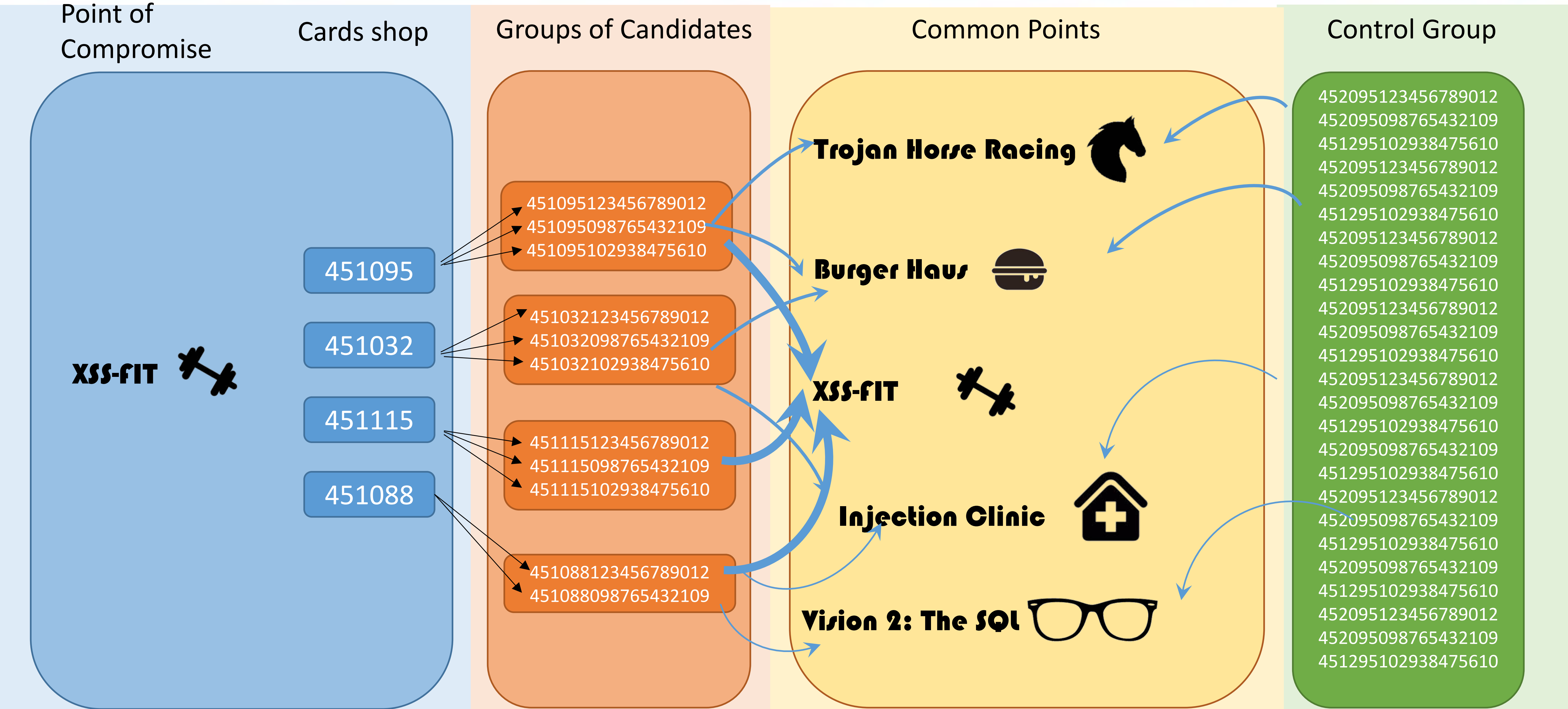
Introduction

- Losses from credit card fraud amount to more than $10 billion dollars annually.
- This money feeds into organized crime, gang activity and terrorism.
- Combatting credit card fraud historically has been a reactionary process.
- By using intelligence gathered from online sources such as the dark web combined with transactional data, we can:
  - identify who the next fraud victims will be
  - where card data is being stolen from
  - before any fraudulent transactions have occurred
  - Without any criminal financing

Traditional Point of Compromise Detection

- Algorithm/Customer/Payment service flags transaction
- Purchase histories of victims are cross-correlated for Common Points of Purchase (CPP).
- List of CPP leads to a Point of Compromise (POC)
- This approach is problematic:
  - Allows fraudsters to purchase and use stolen cards.
  - Requires waiting for more victims to confirm POC.

Dark Web Approach



Point of Compromise

Cards shop

Groups of Candidates

Common Points

Control Group

XSS-FIT

451095
451032
451115
451088

451095123456789012
451095098765432109
451095102938475610

451032123456789012
451032098765432109
451032102938475610

451115123456789012
451115098765432109
451115102938475610

451088123456789012
451088098765432109

Trojan Horse Racing

Burger Haus

XSS-FIT

Injection Clinic

Vision 2: The SQL

452095123456789012
452095098765432109
451295102938475610
452095123456789012
452095098765432109
451295102938475610
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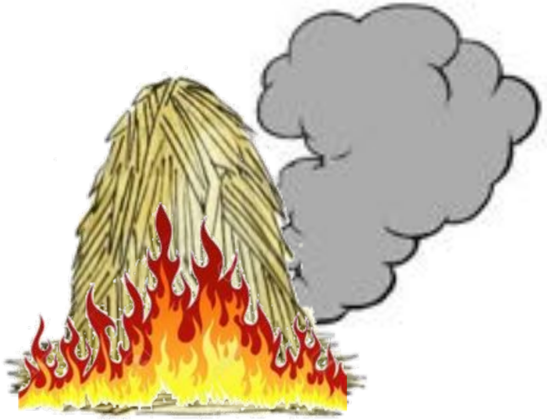
452095123456789012
452095098765432109
451295102938475610

Finding a Needle in a Haystack

- Often a breach can affect a large number of clients.
- Each group can have many candidates.
- Need to find the right combination of clients out of possibly trillions.

Finding a Needle in a Haystack

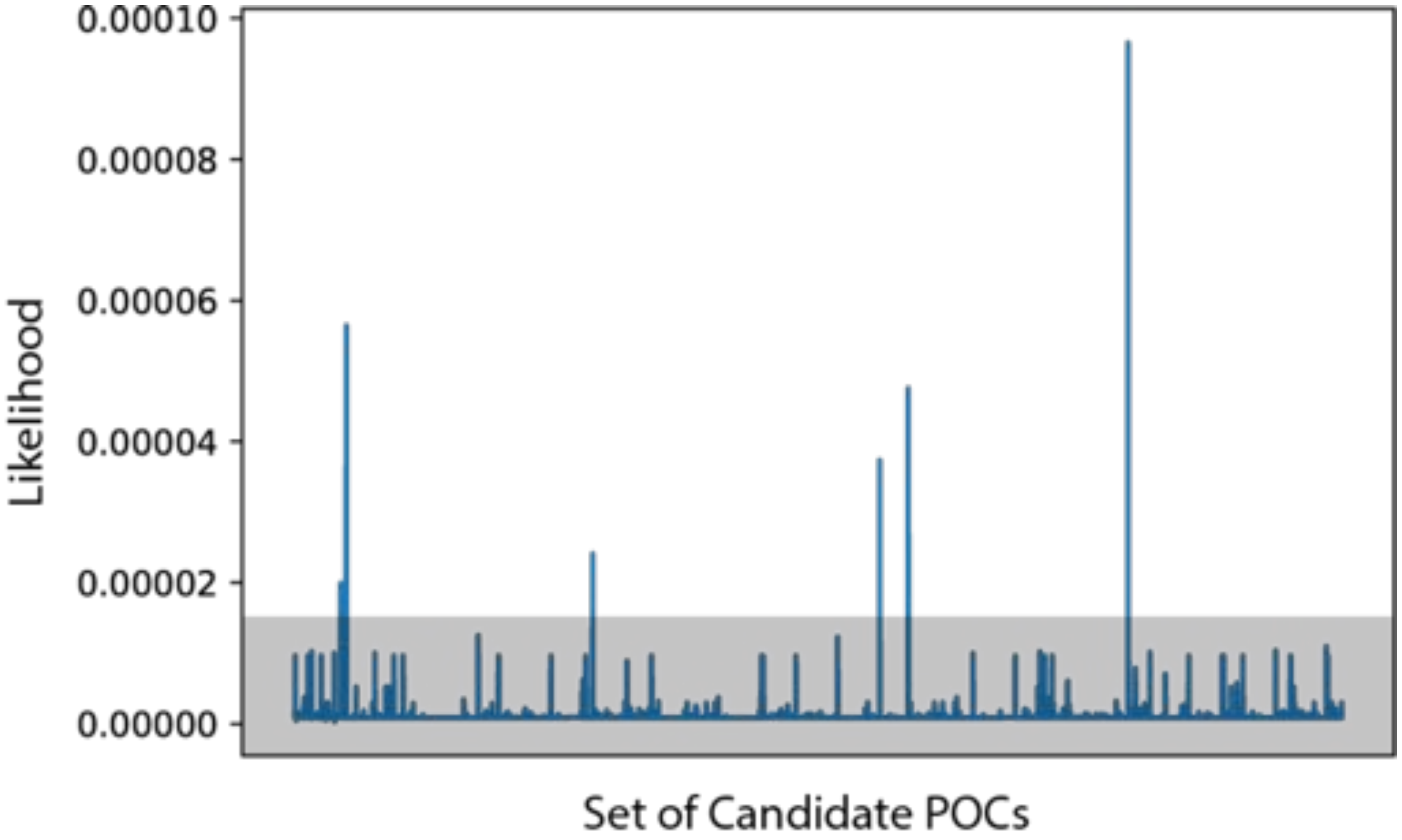


- Set the haystack on fire!
- Ruthless reduction of CPP via various thresholds.
  - The CPP is only shared across less than *g* groups.
  - The popularity of the merchant in the control group is greater than some value *p.*
  - The number of transactions at the CPP is less than *n*.

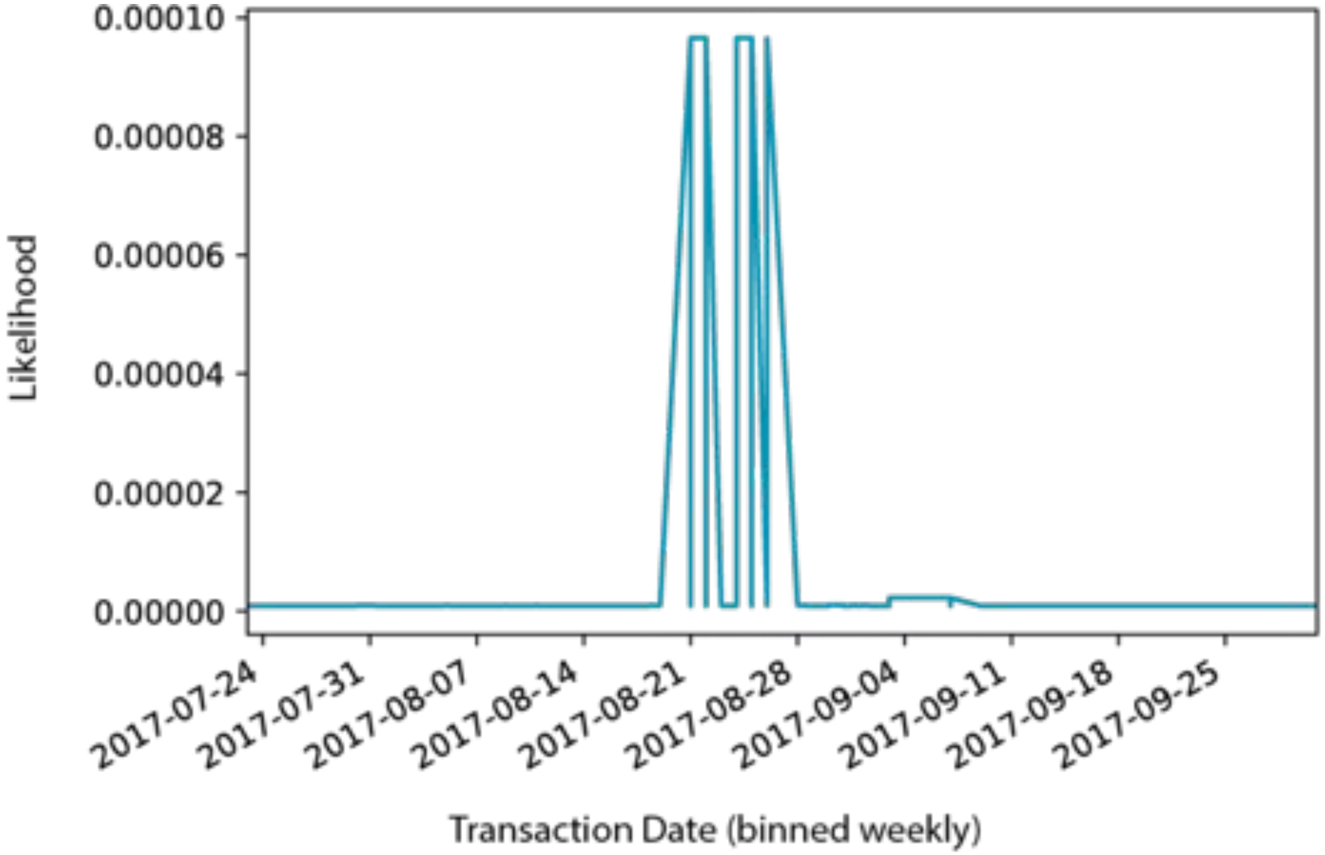
Case Study

- POC spread across ~10 bases.
- Popular restaurant chain – let’s call them “Bob’s”.
- Large impact on many clients.

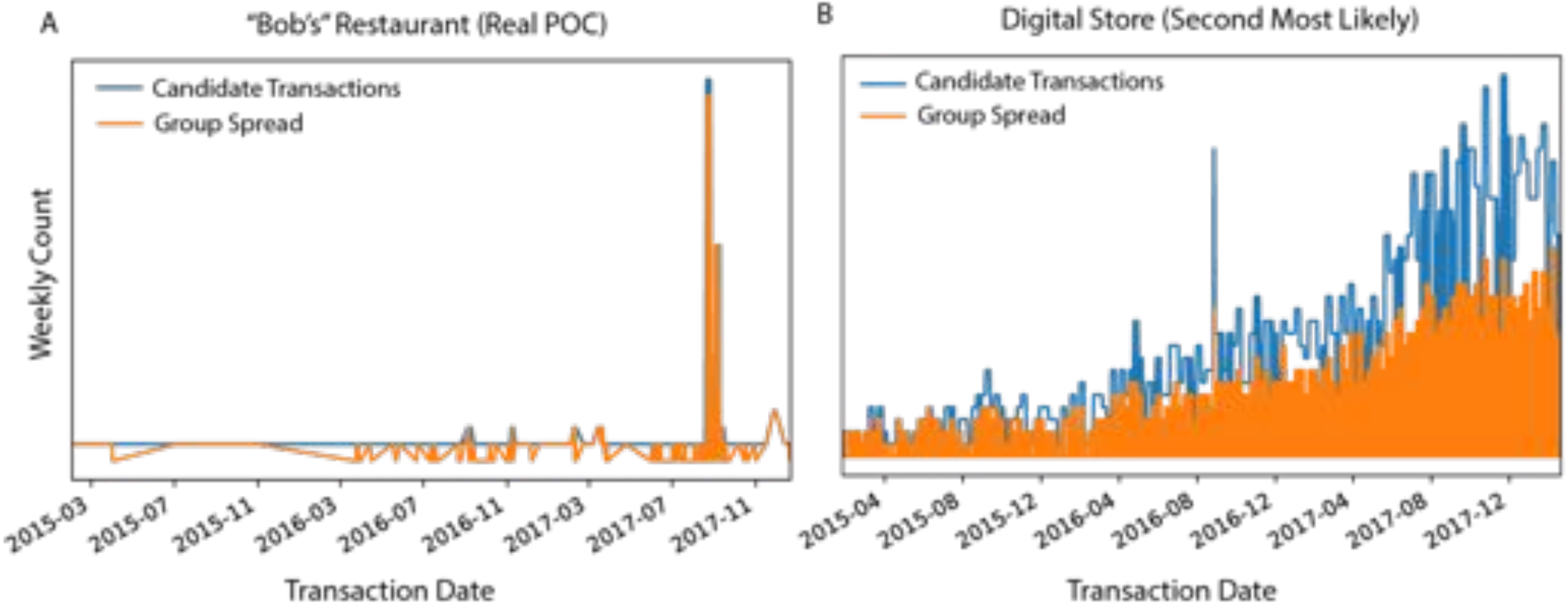
Case Study


0.00010
0.00008
0.00006
0.00004
0.00002
0.00000
Likelihood
Set of Candidate POCs

Case Study


Likelihood
0.00010
0.00008
0.00006
0.00004
0.00002
0.00000
2017-07-24
2017-07-31
2017-08-07
2017-08-14
2017-08-21
2017-08-28
2017-09-04
2017-09-11
2017-09-18
2017-09-25
Transaction Date (binned weekly)

Case Study


A
"Bob's" Restaurant (Real POC)
Candidate Transactions
Group Spread
Weekly Count
2015-03
2015-07
2015-11
2016-03
2016-07
2016-11
2017-03
2017-07
2017-11
Transaction Date
B
Digital Store (Second Most Likely)
Candidate Transactions
Group Spread
2015-04
2015-08
2015-12
2016-04
2016-08
2016-12
2017-04
2017-08
2017-12
Transaction Date

Conclusions

- The dark web enables convenient, one-stop shop selling sensitive information such as credit card details.

- Traditional fraud detection is reactive and permits a thriving criminal ecosystem.

- By leveraging dark web intelligence we can detect data breaches, prevent fraud, and eliminate criminal funding.

Thank You

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