Geospatial Analytics for Anti-Money Laundering & Counter Threat Finance Investigations

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Mitigate the Threat

Q: What actions should a financial organization take in finding, freezing, and forfeiting criminally derived income and assets?

- Anti-Money Laundering (AML)

- Counter Threat Finance (CTF)

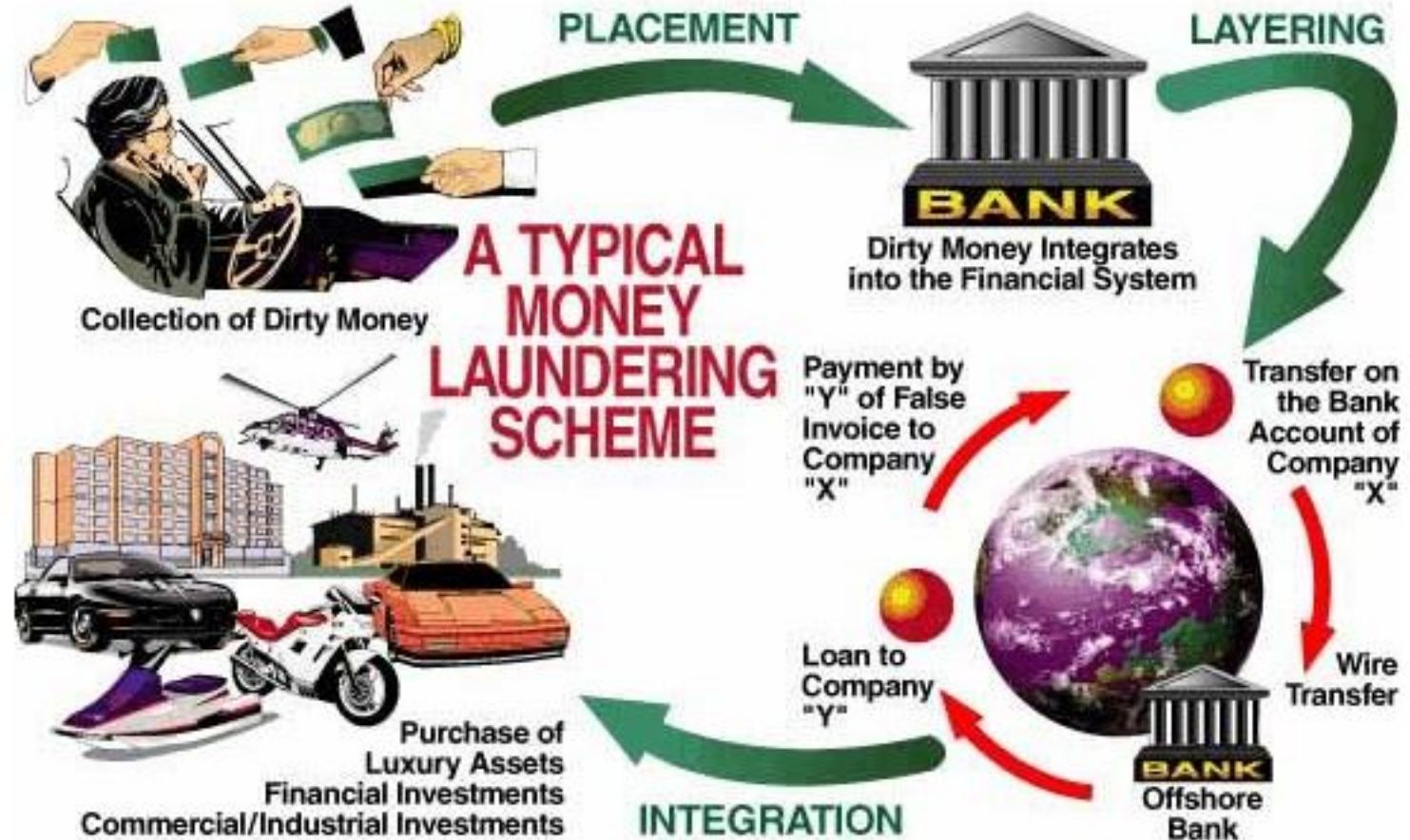- Transactions = relationships between entities

Typical Cash Money Laundering Scheme

Collection of Illicit Money

1. Placement
2. Layering
3. Integration

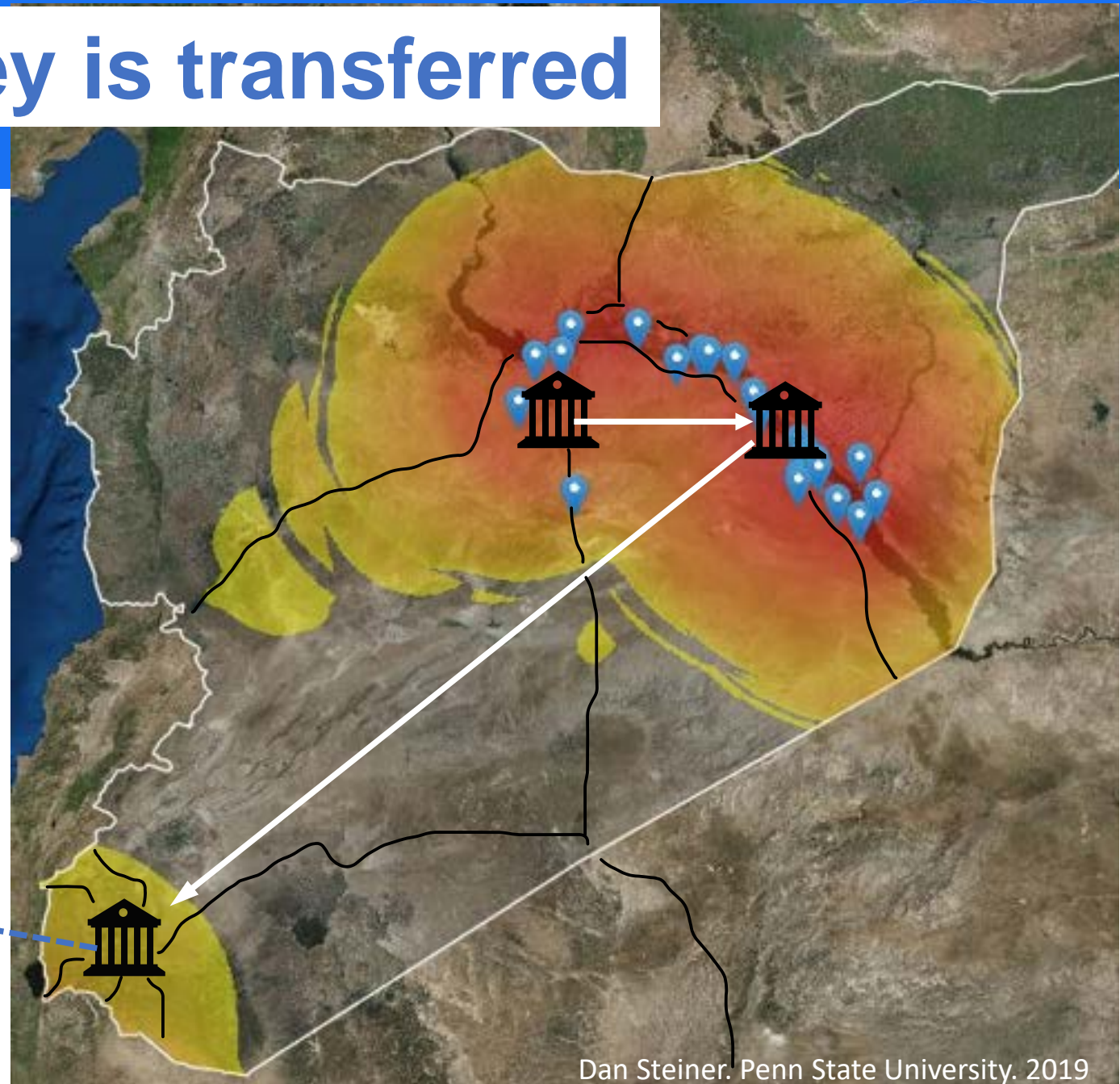UNODC. The Money-Laundering Flow. Web. 2019

More than just money is transferred

High Value Transactions

- Cash & Currency
- Antiquities, Artwork
- Real Estate

How to handle Banking Anomalies?

Bitcoin … Digital Currency?

Dan Steiner. Penn State University. 2019

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Financial Transactions

Originator

Beneficiary

FIs

Payment Notes

Domestic & International

Space & Time

Transaction Number	Date	Amount	Originator	Originator Acct Number	Beneficiary	Beneficiary Acct Number	Remittance Ref	Payment Type	Originator Bank	Originator Address 1	Originator Address 2	Originator Country Code	Beneficiary Bank
12345	1/29/2019	75	Jay McCabe	1234568	Gillbert L McCabe	1234566	Car Re-Pay 34 of 40 almst done thnx	Mobile	Banco Falso	Pennypacker	State College PA	US	Banco Falso
12344	1/29/2019	235	Jay McCabe	1234568	Food Tow			Debit Card	Banco Falso	Pennypacker Hall	State College PA	USA	Fals Bank
12355	1/29/2019	200	Jay McCabe	1234568	EZPARK		eb Parking	Check	Banco Falso	Penny Packer Hl Rm 12	State College	USA	Big Bank
13355	1/29/2019	2500	Jay McCabe	1234568	BitFake	7899990	Vacuum Sales	Wire	Banco Falso	PennyPackery Hall Room 12	State College		Apomimisi Bank Astoria
13445	1/29/2019	2500	Jay McCabe	1234568	BitFake	7899990	Vacuum Sales	Wire	Banco Falso	PennyPackery Hall Room 12b	United States		Apomimisi Bank Astoria
13656	1/29/2019	2500	Jay McCabe	1234568	PhonyCoin	7899991	Vacuum Sales	Wire	Banco Falso	Penny Packer Hall Room 122b	PA	USA	Apomimisi Bank Astoria
13899	1/29/2019	2000	Jay McCabe	1234568	PhonyCoin	9988046	Vacuum Sales	Wire	Banco Falso	PennyPacker	Room 12bg	USA	Apomimisi Bank Astoria
14011	1/29/2019	500	Jerry M Claxton	9988046	Jay McCabe	1234568	Acct Redist	Wire	Apomimisi Bank Astoria	Grecineku leala	Riga	LV	Banco Falso
15032	1/29/2019	89	Jay McCabe	1234568	Gillbert L McCabe	1234566	Noise Violation Ticket Srry	Mobile	Banco Falso	Penny Packer Hl Rm 12	State College	USA	Banco Falso
16022	1/30/2019	2500	Jay McCabe	1234568	BitFake	7899990	Fridge Sale	Wire	Banco Falso	Penny Packer Hl Rm 12	Stat		Apomimisi Bank Astoria

Financial Data is Geospatial Data

- People
- FIs
- Financial Link-Network
- Transactions

- Risks
- Proximities
- Unusual Activity
- Large Amounts of *xxxx*

"Know Your Customer" & Verify Client Identities

Geospatial Analysis

Method	Analytic Question
Descriptive	What happened?
Real Time	What is happening now?
Predictive	What could happen? Likelihood?
Prescriptive	What should we do?

Data Collection & Management

- Georeferenced data & Data enrichment

- Imagery, where relevant

- Geospatial information

- Regulatory & International Organizations
  - ✓ Dep't Homeland Security, FBI, State Department
  - ✓ Financial Action Task Force (FATF)

Current Geospatial View of Money Laundering

Bosnia and Herz.
North Korea
Syria Iraq Iran Afghanistan
Laos
Yemen
Uganda
Vanuatu

Labeled

"Strategic" money laundering deficiencies
Countries designated by the Financial Action Task Force (Oct. 2016)

Major illicit drug transit or drug production
Countries designated by the President (Sept. 2016)

"Major" money laundering concern
Jurisdictions identified by the State Department (March 2016)

"Primary" money laundering concern
Designated by the Financial Crimes Enforcement Network
● Countries   ▪ Financial Institutions

Congressional Research Service. Anti-Money Laundering: An Overview for Congress. 1 Mar 2017.

Geospatial Analysis

Detection and Visualization Techniques

1. Outliers or Anomalies

2. Colocation Patterns

3. Hotspot – Clustering Statistics

4. Teleconnection

5. Predictions

Outliers & Anomalies

- Patterns
- Risk Areas
- R Statistics
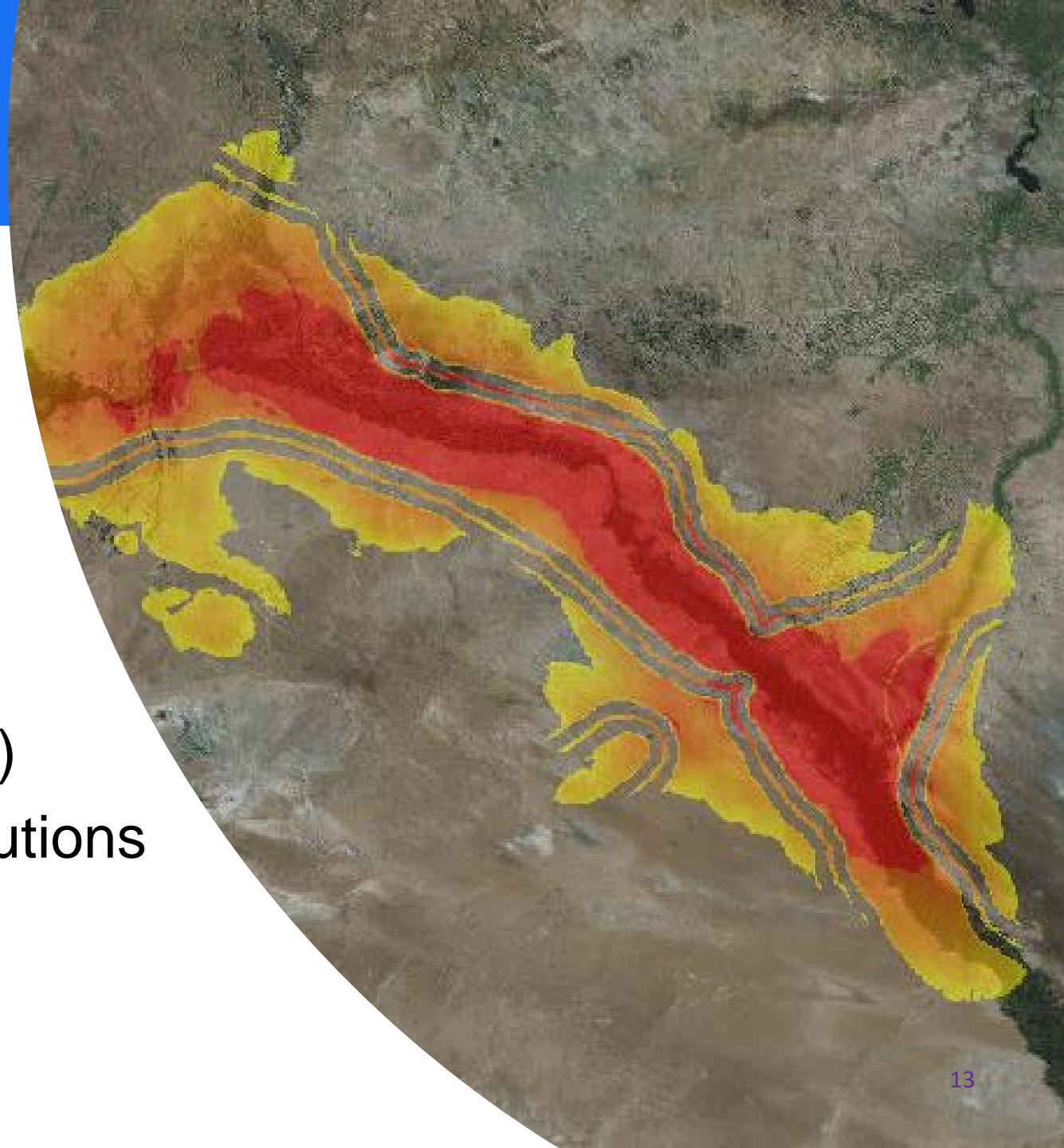
Colocation Technique

Alteryx Analytics Platform
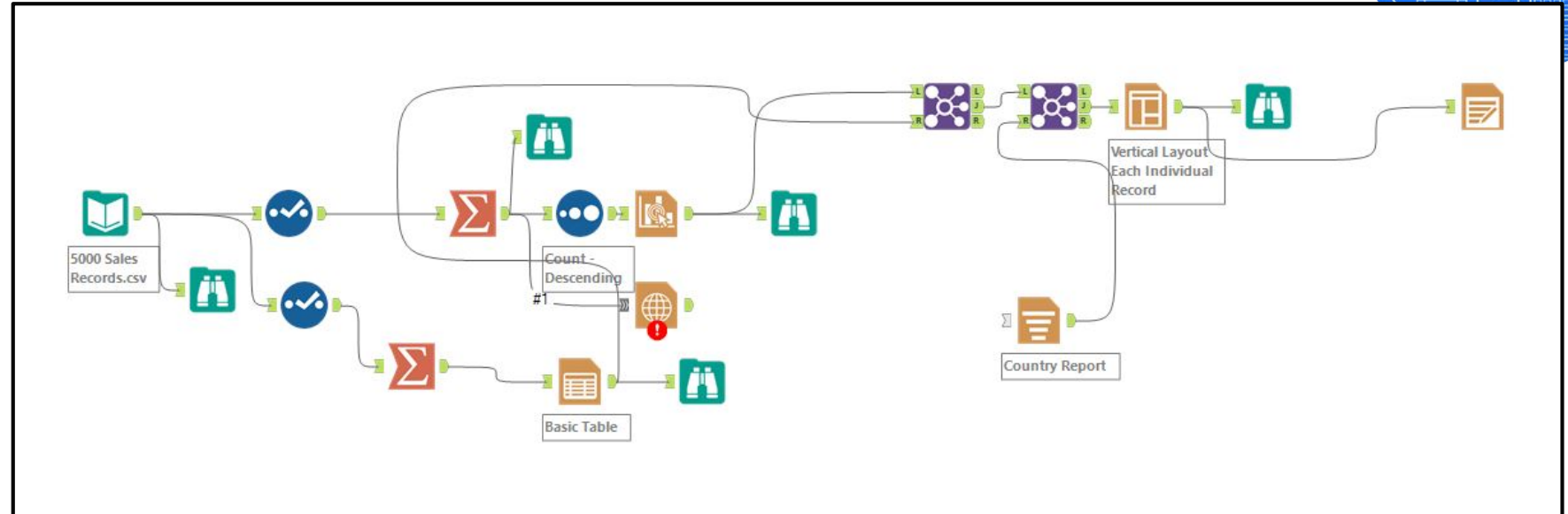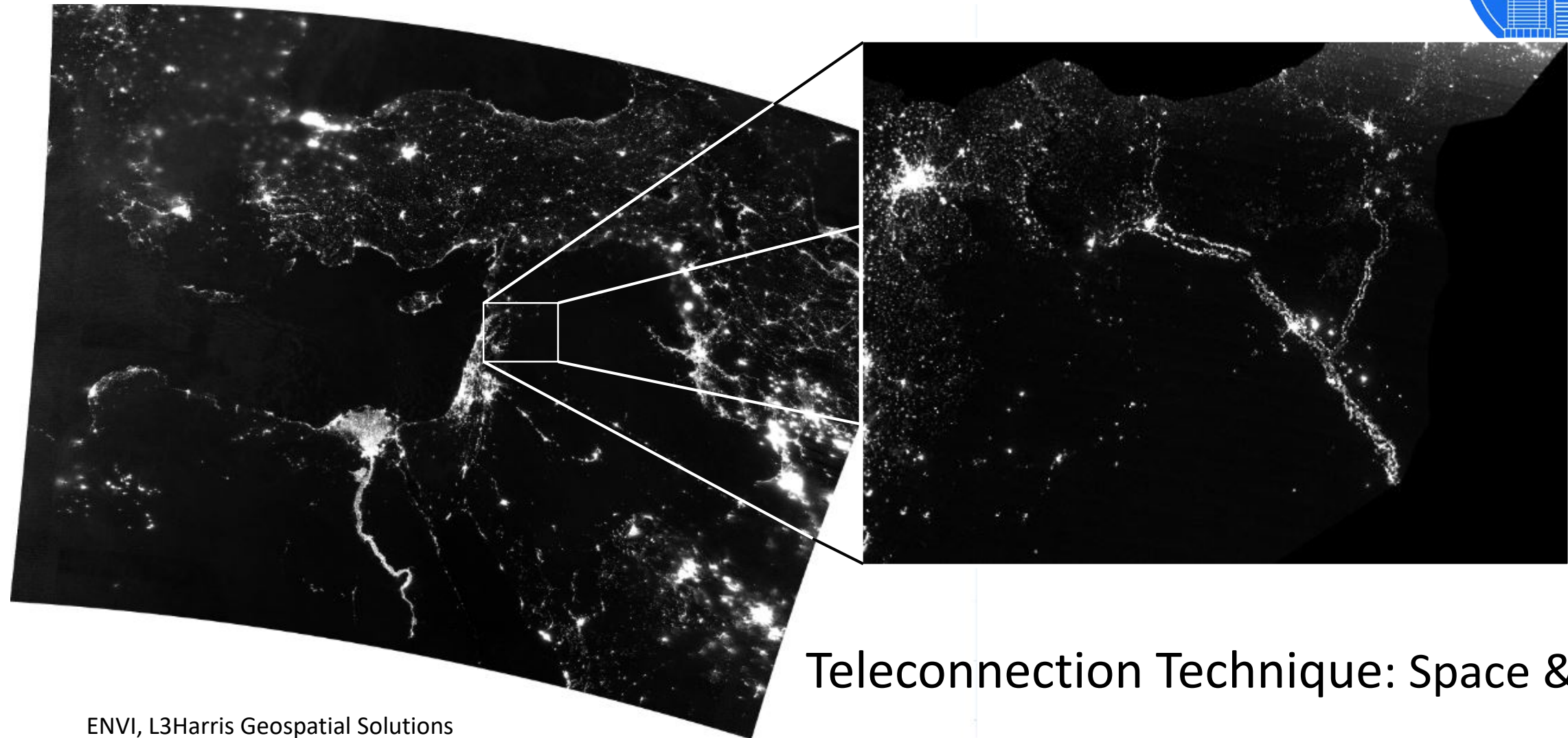

Modeling with Structured & Unstructured Data

- Link Networking

- Statistical Evaluation & Significance

- Fraud Analysis

- Geospatial Patterns

Hotspot Detection

- Corridors
- Funding Streams
- Geospatial Information
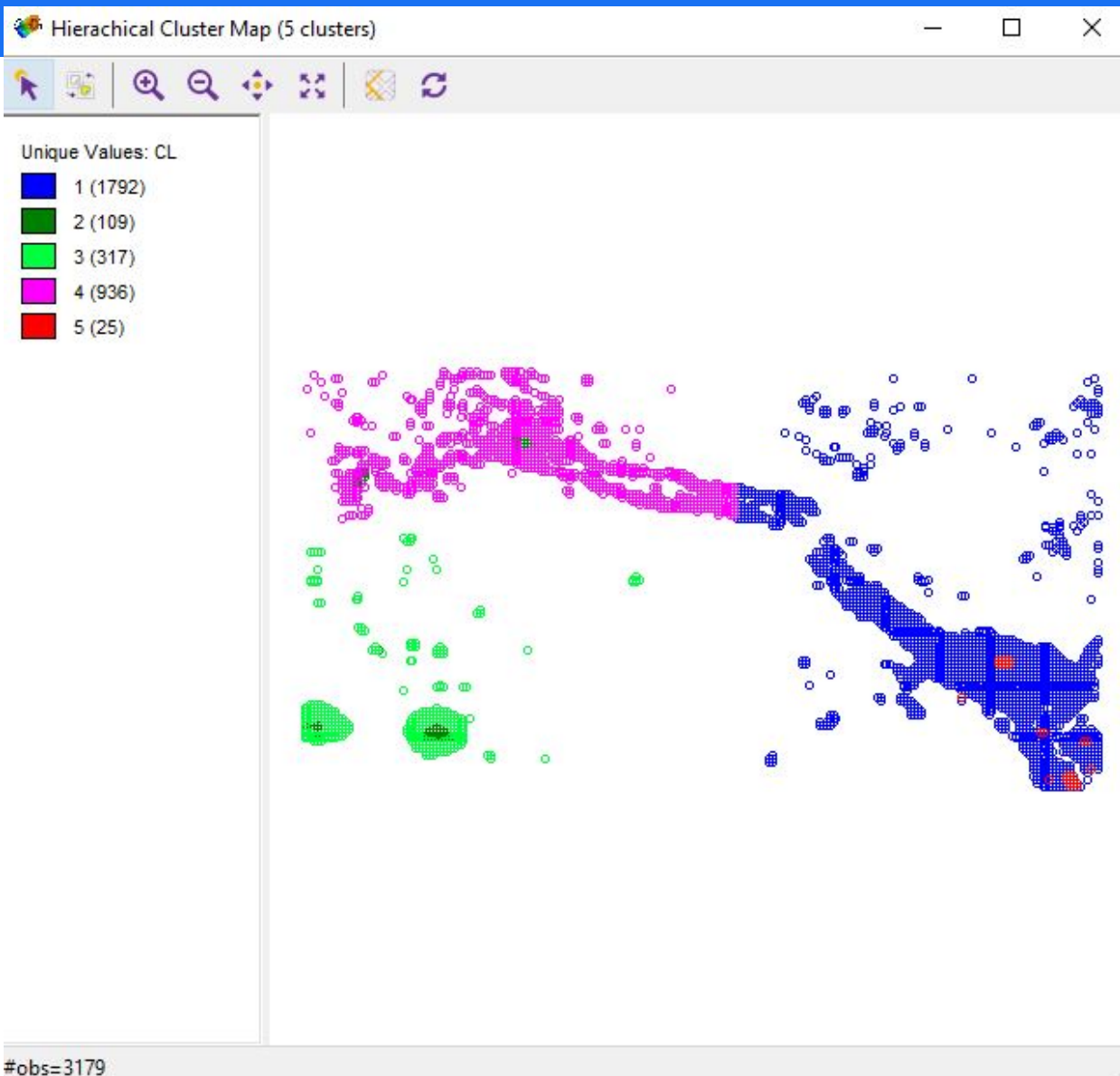- Activity-Based Intelligence (ABI)
- Risks to Nearby Financial Institutions

Using ENVI® to Rectify VIIRS Imagery

Teleconnection Technique: Space & Time

ENVI, L3Harris Geospatial Solutions
VIIRS Imagery, NASA, 2018

Predictions
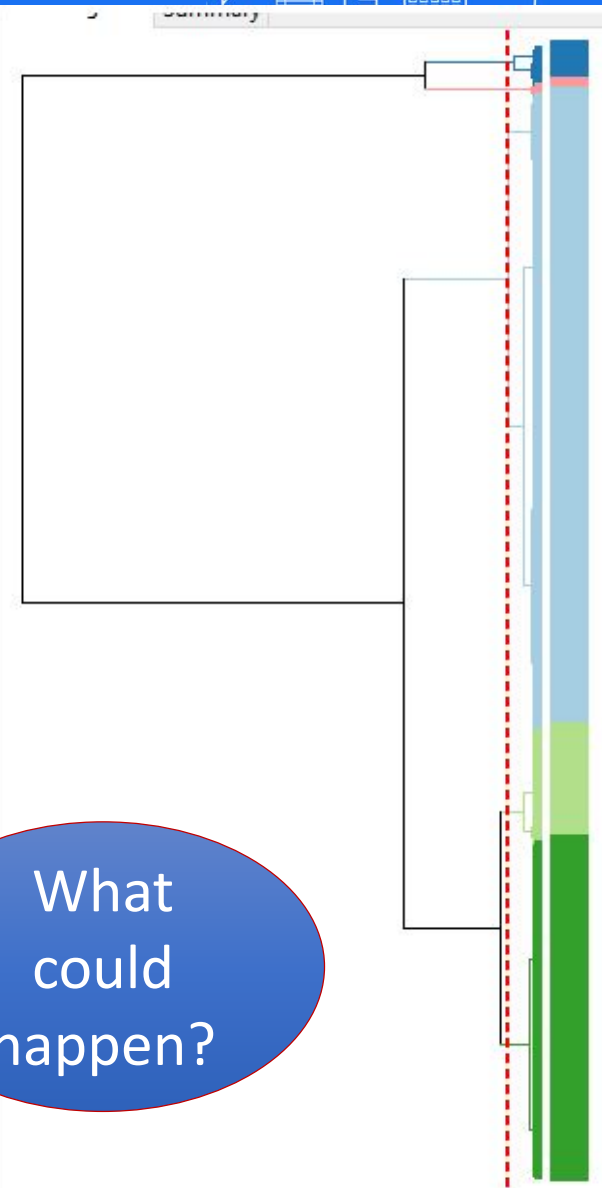
Applying Prescriptive Analytics to AML / CTF Investigations

Geospatial Analysis Methodology for AML/CTF

ABI Related

1
Geospatial EDA

2
Problem & Environment

3
Enrich Data

4
Prescriptive Analytics

5
Recommend COA

COA 1

COA 2

COA x
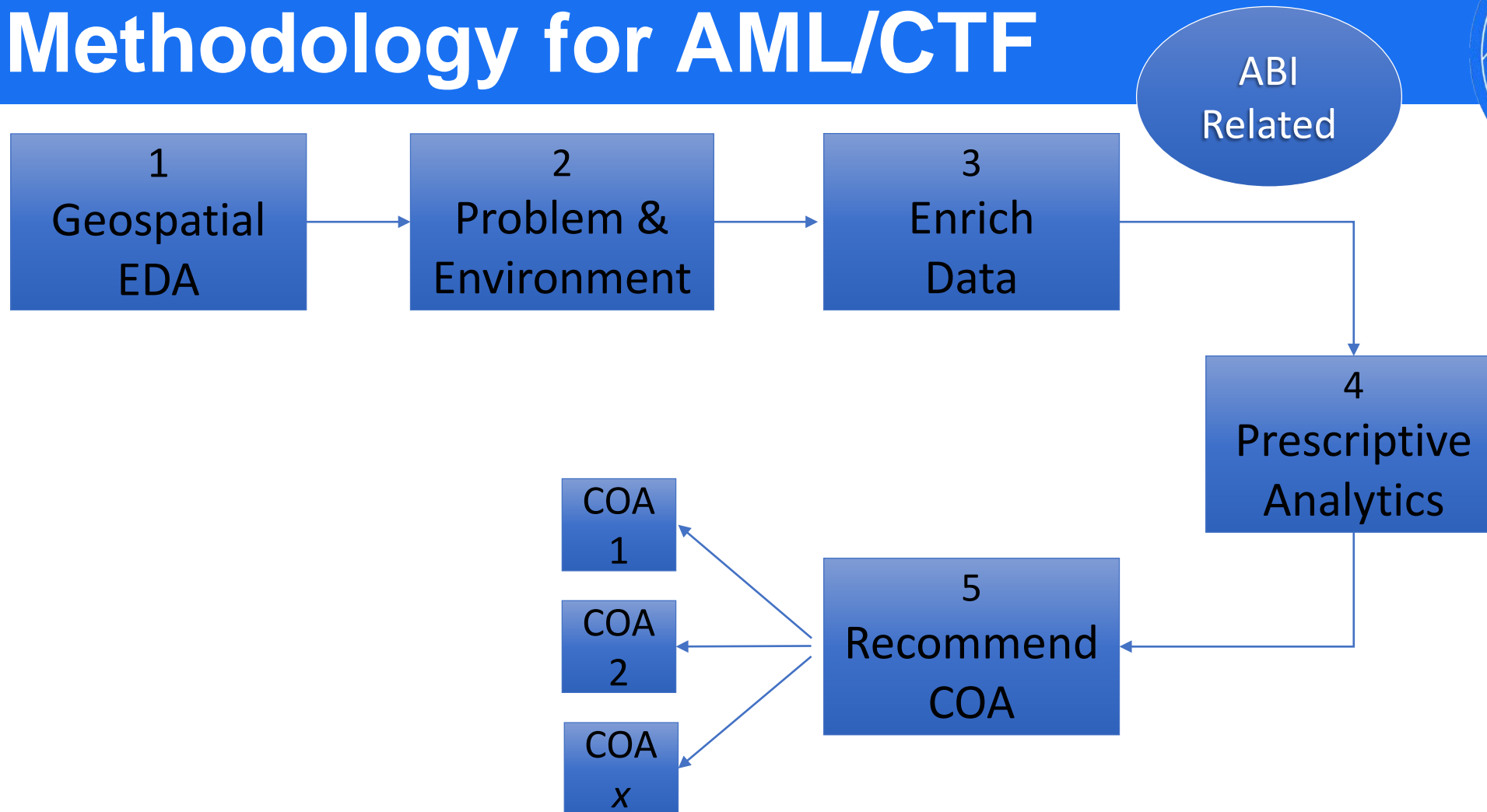
Prescriptive Analytics: Advise on possible outcomes

What should we do?

Course of Action 1

Course of Action 2

Course of Action x
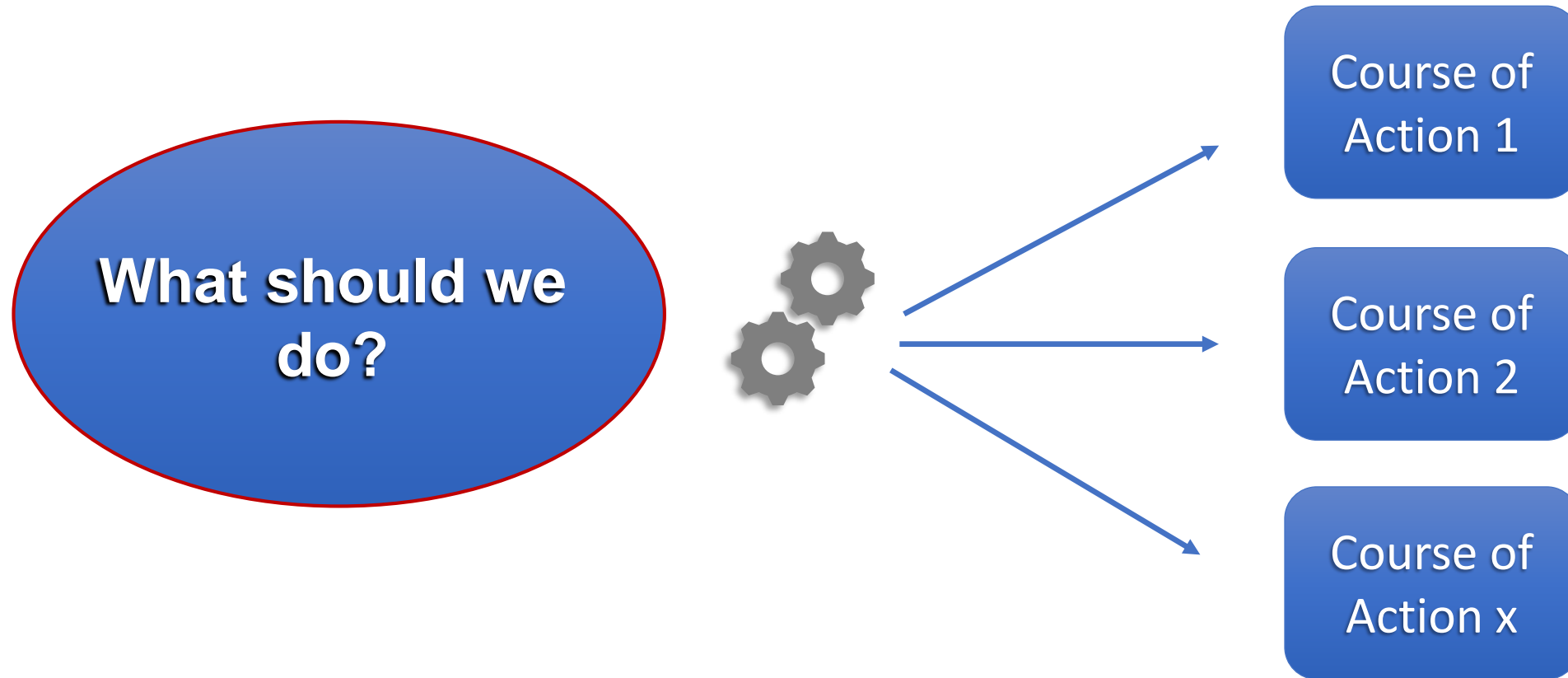
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