



Data Science
vs.
Money Laundering

Óli Páll Geirsson, Ph.D.
VP of Data Science
olipall@lucinity.com

Data driven decisions

The practice of making decisions and taking informed operational actions that can be backed up with verifiable data

We are all about empowering data driven decisions

“You can’t manage what you don’t measure” [1]

[1] McAfee, A., Brynjolfsson, E., Davenport, T.H., Patil, D.J. and Barton, D., 2012. Big data: the management revolution. Harvard business review, 90(10), pp.60-68

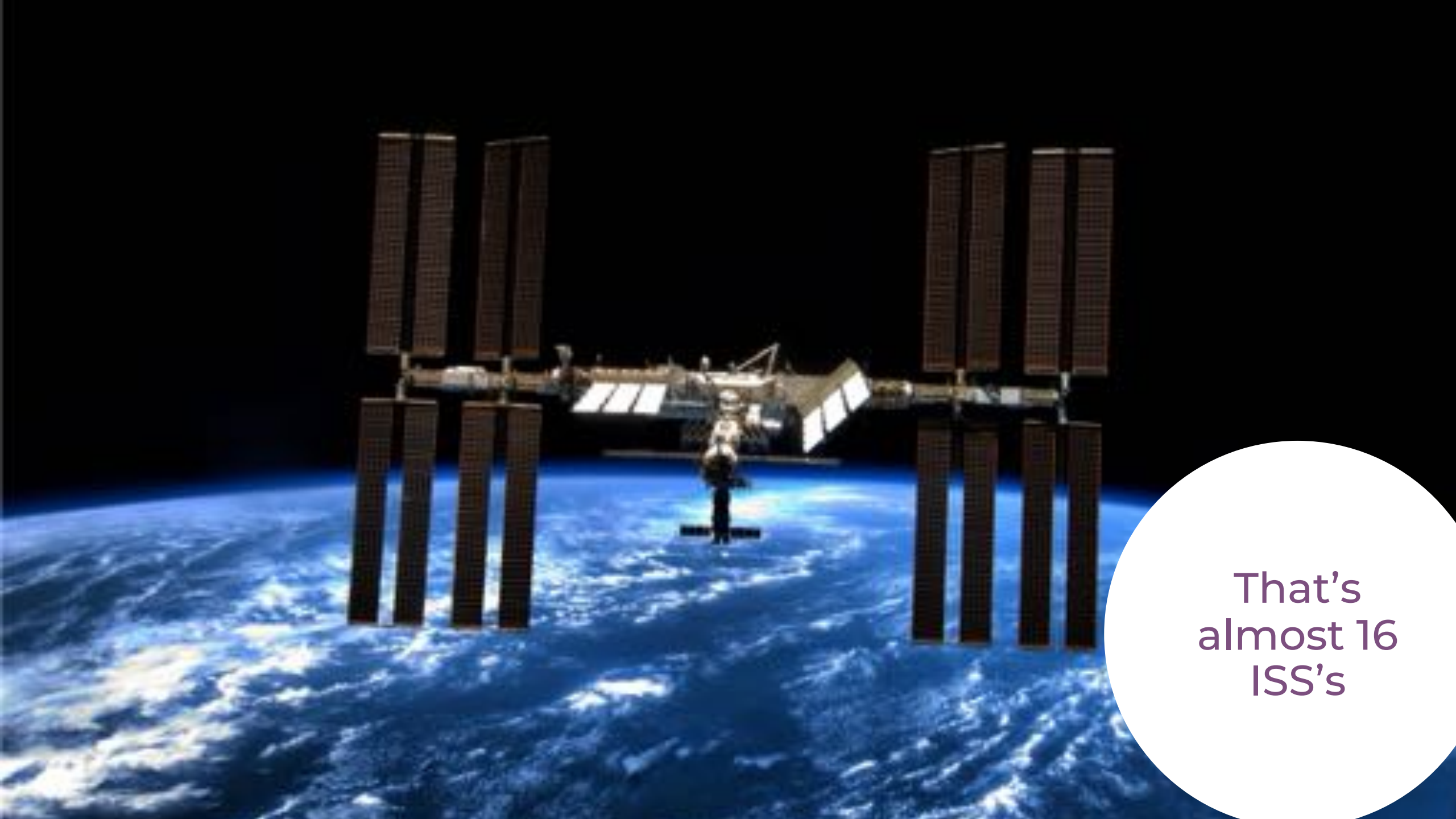
...so, let's talk

Money laundering





\$2.5
Trillion



That's
almost 16
ISS's

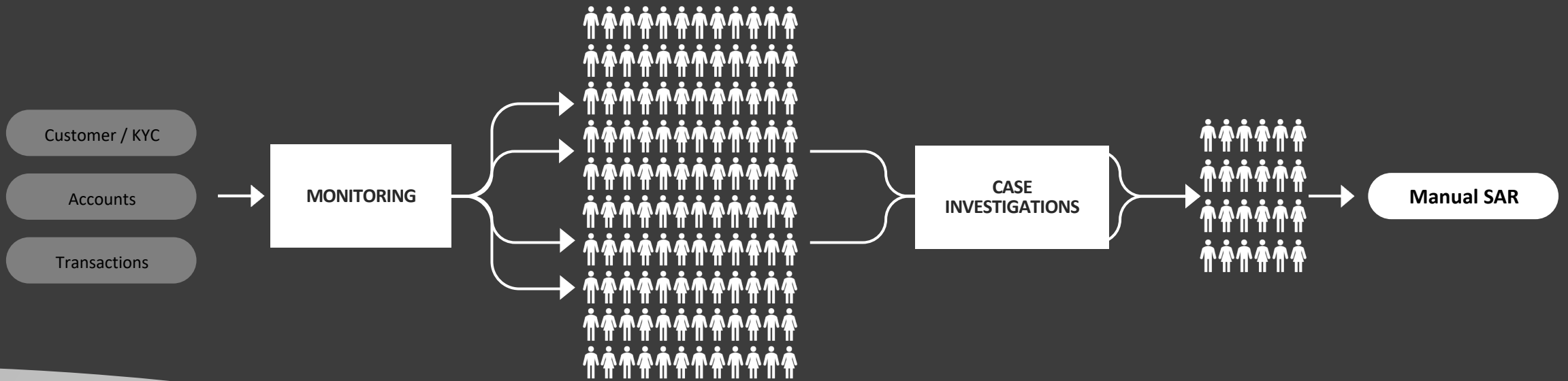


\$2.5
Trillion

\$232
Billion

< 1%

AML workflow



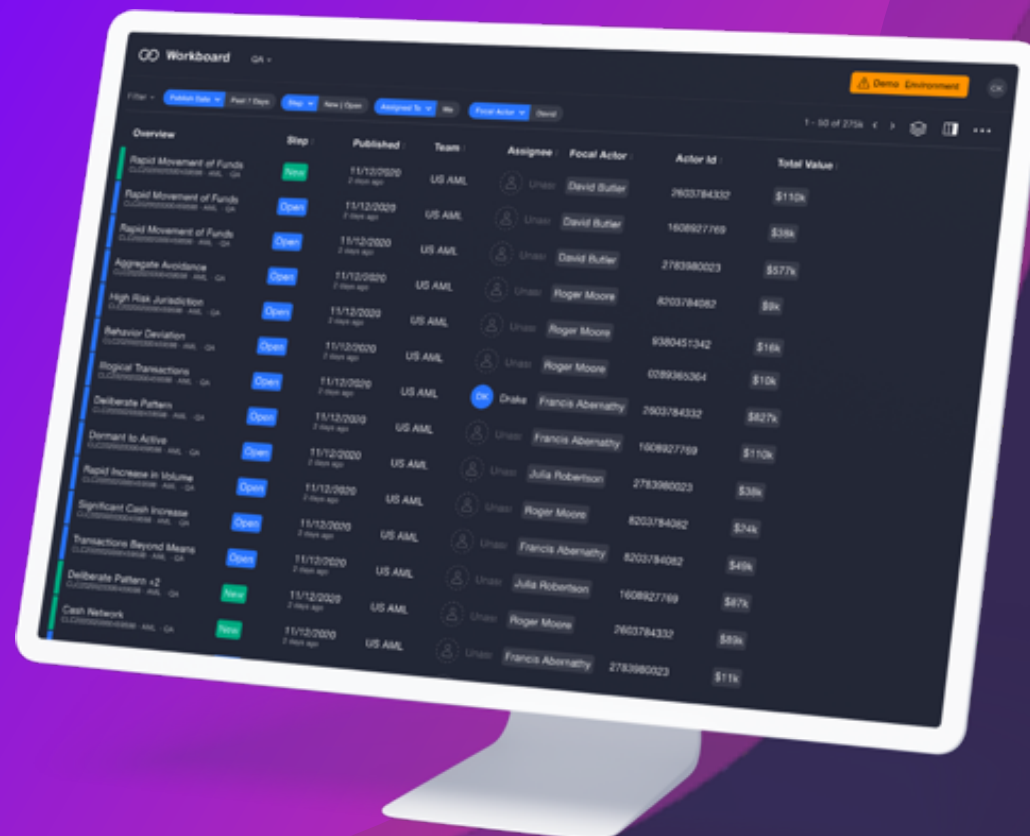
1 to 4%
of revenue spent
by Fis each year on AML

>500.000 PEOPLE
work mostly on false
positives every day

Regulatory Pressure
resulting in increase cost
pressures

Skill Gap
further resulting in
increase cost pressures

We bring productivity to AML through Human AI



The image shows a computer monitor displaying the Lucinity Workboard interface. The interface is a table with columns: Step, Published, Team, Assignee, Focal Actor, Actor ID, and Total Value. The table lists various AML cases, such as 'Rapid Movement of Funds', 'Aggregate Avoidance', 'High Risk Jurisdiction', 'Behavior Deviation', 'Suspicious Transactions', 'Deliberate Pattern', 'Demand to Active', 'Rapid Increase in Volume', 'Significant Cash Increase', 'Transactions Beyond Means', 'Deliberate Pattern - 2', and 'Cash Network'. Each row includes a status indicator (e.g., 'New', 'Open', 'Done') and a 'Total Value' column.

Step	Published	Team	Assignee	Focal Actor	Actor ID	Total Value
New	11/12/2020	US AML	Unassigned	David Butler	2603784332	\$110k
Open	11/12/2020	US AML	Unassigned	David Butler	1608927769	\$38k
Open	11/12/2020	US AML	Unassigned	David Butler	2783980023	\$577k
Open	11/12/2020	US AML	Unassigned	Roger Moore	8203784082	\$8k
Open	11/12/2020	US AML	Unassigned	Roger Moore	9380451242	\$16k
Open	11/12/2020	US AML	Unassigned	Roger Moore	0089365264	\$10k
Open	11/12/2020	US AML	Unassigned	Francis Abernathy	2603784332	\$827k
Open	11/12/2020	US AML	Unassigned	Francis Abernathy	1608927769	\$110k
Open	11/12/2020	US AML	Unassigned	Julia Robertson	2783980023	\$38k
Open	11/12/2020	US AML	Unassigned	Roger Moore	8203784082	\$24k
Open	11/12/2020	US AML	Unassigned	Francis Abernathy	8203784082	\$40k
Open	11/12/2020	US AML	Unassigned	Julia Robertson	1608927769	\$87k
Open	11/12/2020	US AML	Unassigned	Roger Moore	2603784332	\$89k
Open	11/12/2020	US AML	Unassigned	Francis Abernathy	2783980023	\$11k

4X
more true positive cases found

50%
reduction in cases

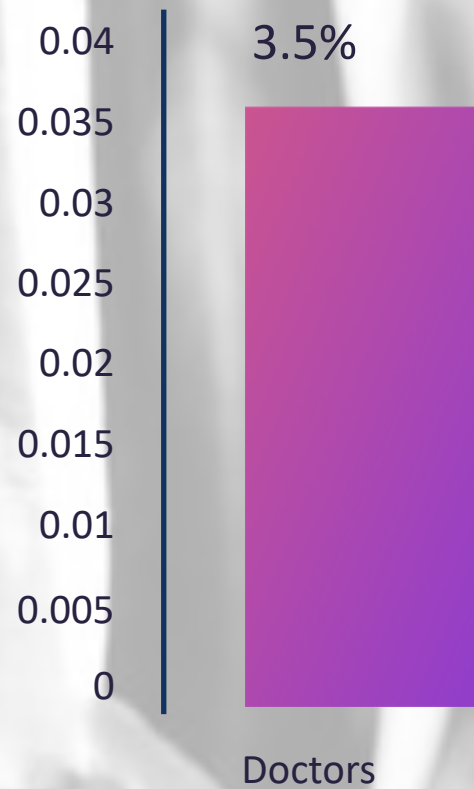
FROM 4 TO 1 HOURS
per SAR through process improvement*

but...
what does that even **mean**?



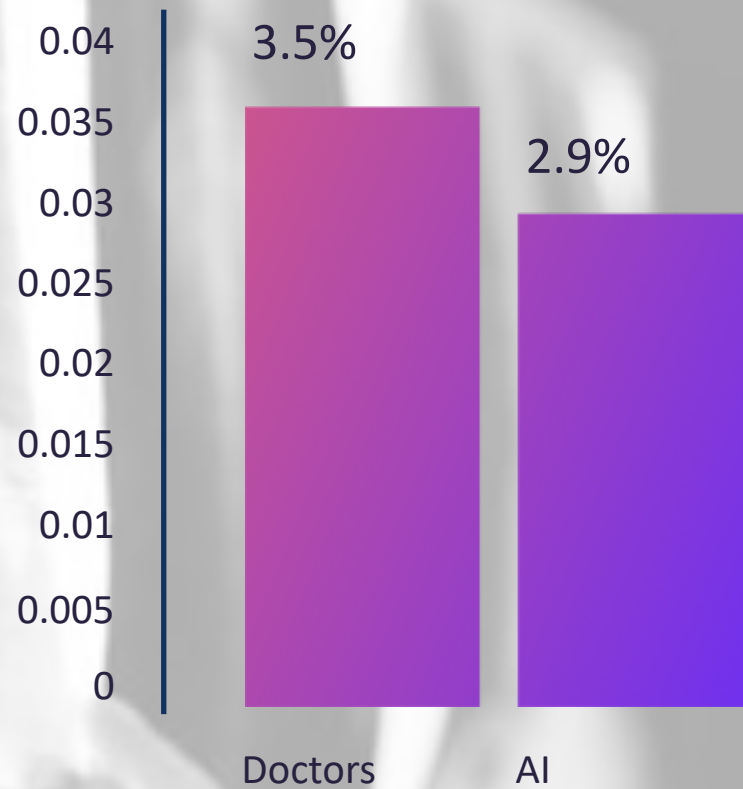
alright, let's do a
motivational example from medicine





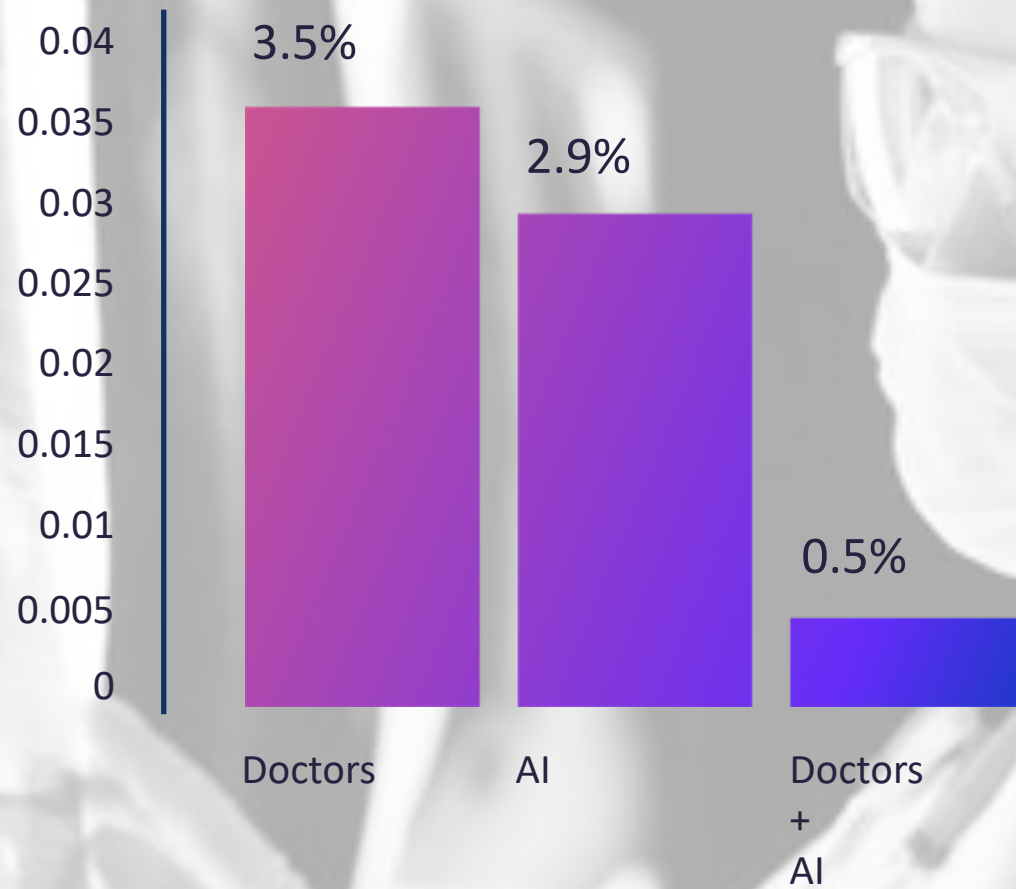
Oncology study





AI helps them save more lives





Human + AI helps save even more lives





1.9x

Faster



Let's use data science to find the money laundering **needle in the haystack**

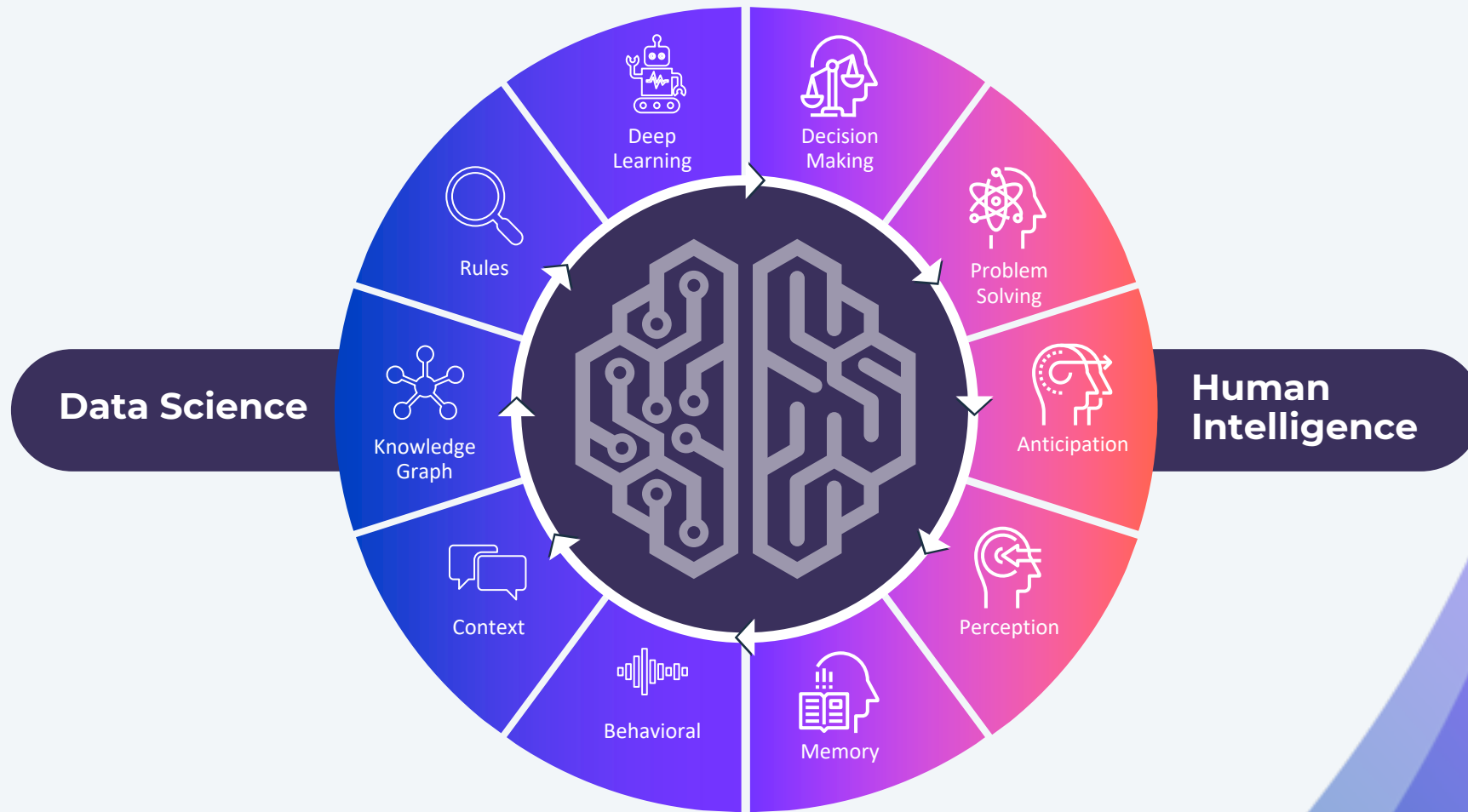


and let humans do the **evaluation and interpretation**

Human AI



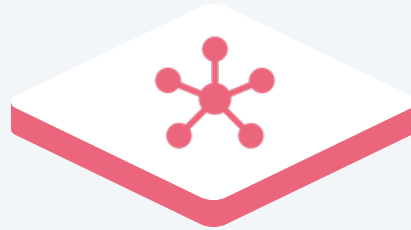
... or more precisely



Data driven approach



**Regulatory &
FinCrime Research**



**Knowledge
Graph**



Behavioral models



Explainable models



**Continuous
Improvement**

Regulatory & FinCrime Research

1. Account/Card utilization inconsistent with stated purpose

Complex account/card and transaction networks, inconsistent product usage, unusual payment methods.

2. Customer activity does not match customer profile

Comprehensive behavioral profiling, deviation from expected and peer group behavior, abnormal shift in transaction activity.

3. Unusual or suspicious customer activity

Circular fund movements, increased activity after dormancy, unusual device patterns, suspicious references.

4. Exhibiting a deliberate pattern of transactions

Rapid movement of funds, regular and irregular transactional patterns, round amount and systematic patterns.

5. Transacting in high-risk jurisdictions or sectors

Jurisdictions and sectors analyzed along multiple dimensions utilizing trusted sources to determine high risk transactions.

6. Avoiding reporting requirements

Layering schemes, structuring and placement schemes, consideration of spatial and temporal dimensions, thresholds.

7. Concealing customer or beneficiary information

Identity and beneficiary obfuscation, unjustified use of intermediaries and payment processors, shell companies.

Features example

Exhibiting Deliberate Pattern of Transactions

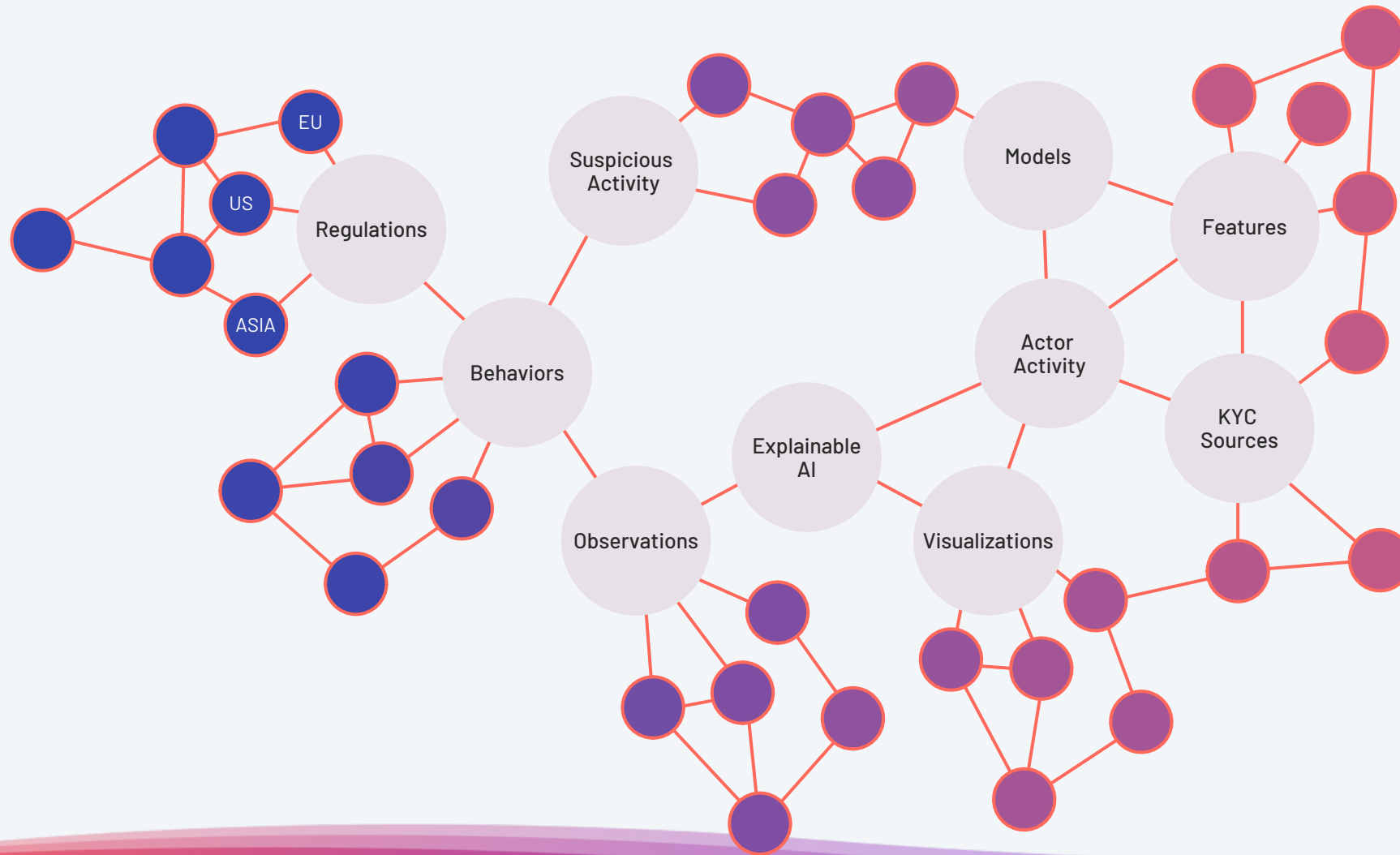
Rapid movement of funds

A scheme used to obscure the origin of funds moving them around the financial system

An example of a good feature

The relative difference between the inflowing amount in the last 3 days and the outflowing amount in the last 3 days, weighted by the total value of transactions in the last 3 days.

KNOWLEDGE GRAPH



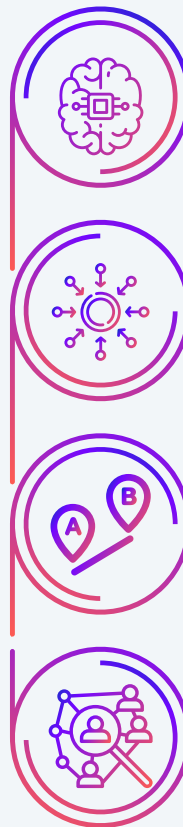
BEHAVIOURAL MODELING

relies on

building **features** that are designed to measure **suspicious activity** and make outliers and patterns **visible**

and

applying those features into a **data science** model that can score and rank actors on a given time interval.



models are trained

using an **unsupervised learning** approach in absence of label or enriched data

and

semi-supervised learning with feedback and labeled data*

*coming soon

Unsupervised learning model selection

Features are used as inputs into models that score and rank each actor

Various unsupervised learning models are applicable to the set of features

There is a trade-off between predictive power and simplicity when implementing models

Scorecards

Logistic
regression

Auto Encoder

Isolation forest

Neural networks

EXPLAINABLE MODELS



Driving engagement of analysts

- Overall effectiveness of AML program relies in no small measure on the analyst reviewing the observation

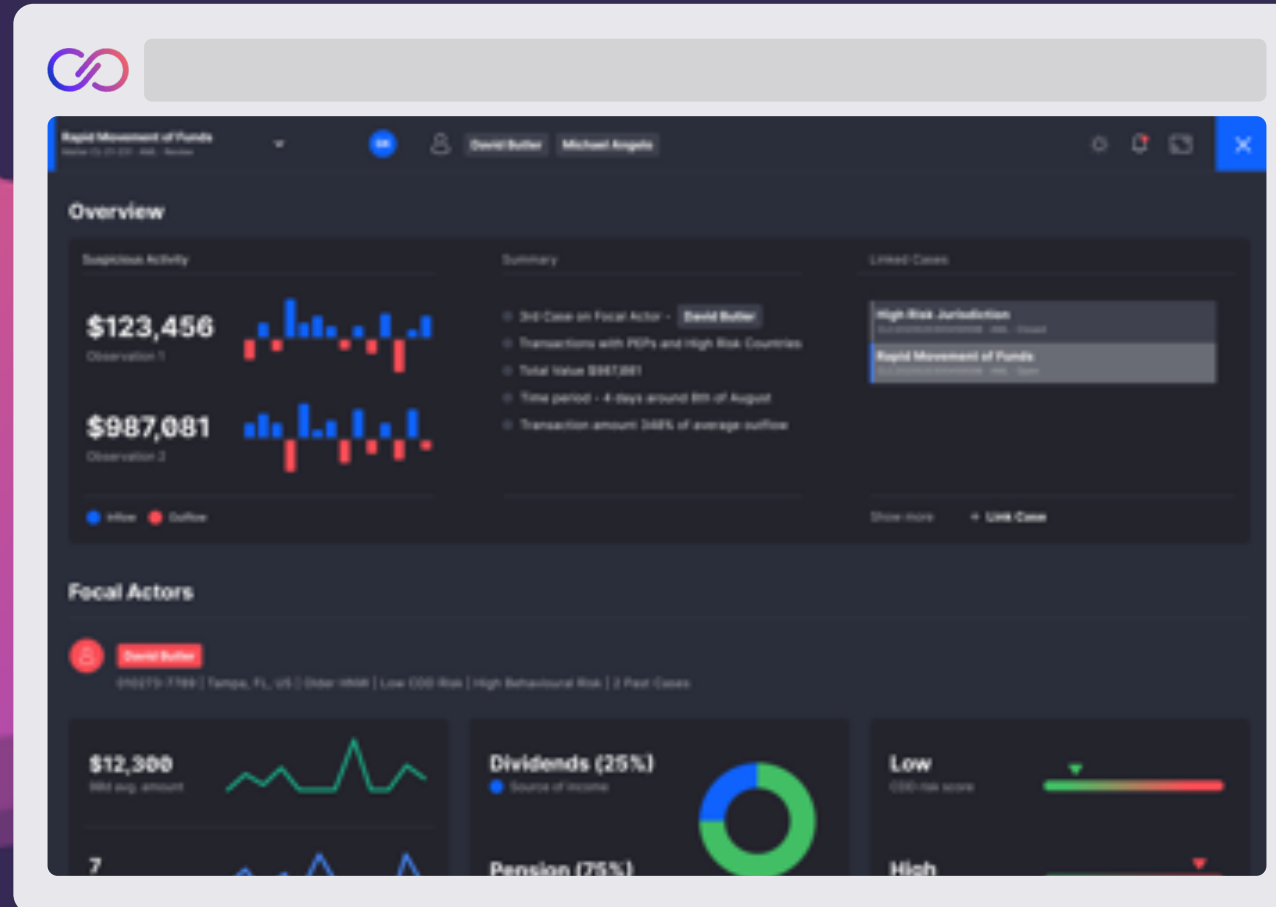


Analyst tool focusing on

- Encapsulate and present data in context of the observation
- Clear representation of contributing factors
- Easy to understand summarization
- Rich visualizations to provide insights
- Reduce case load by minimum 40%
- Reduced fatigue, better review
- 4-fold increase in coverage capability
- Automated Quality Assurance



EXPLAINABLE MODELS



EXPLAINABLE MODELS

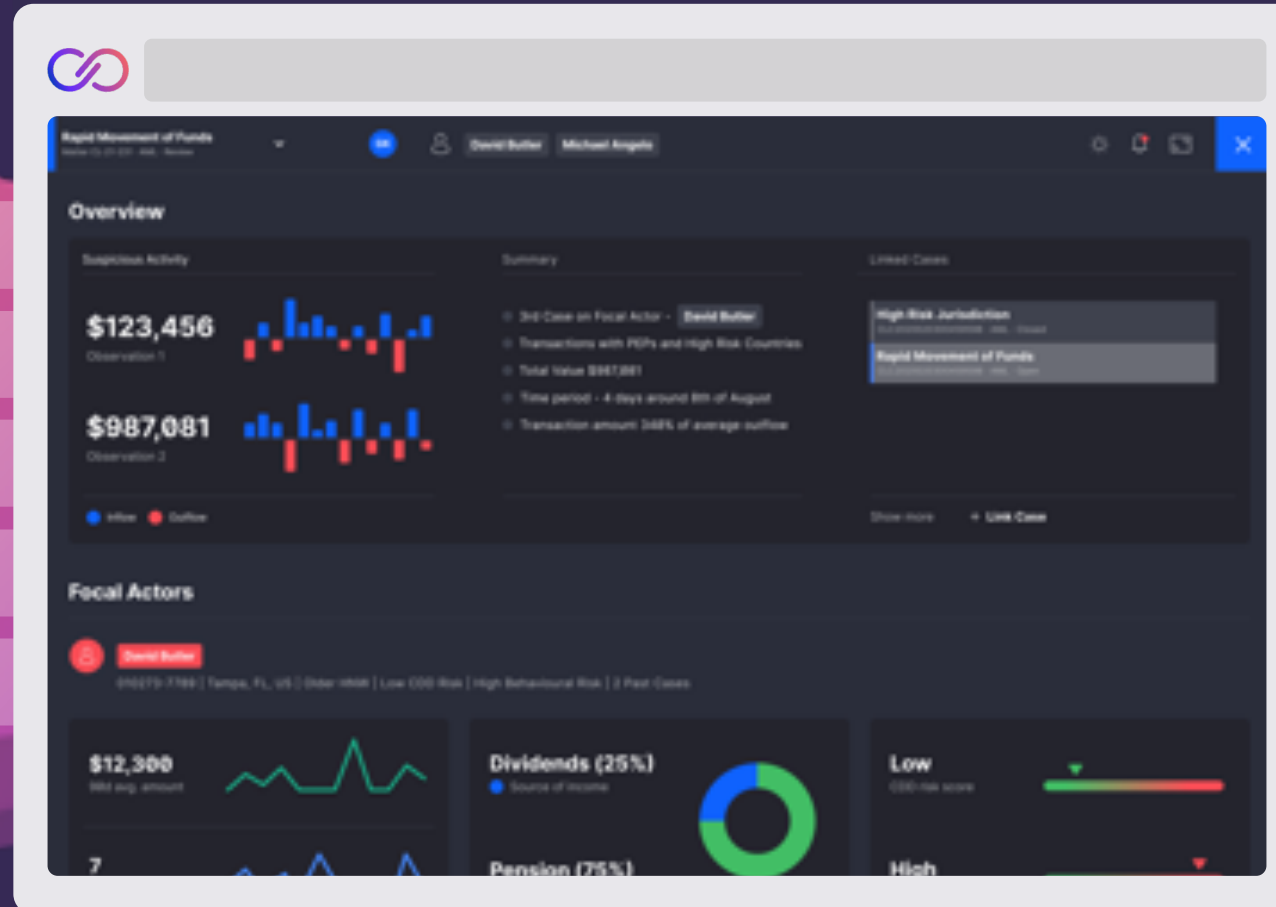
KYC Data

Risk and Credit Data

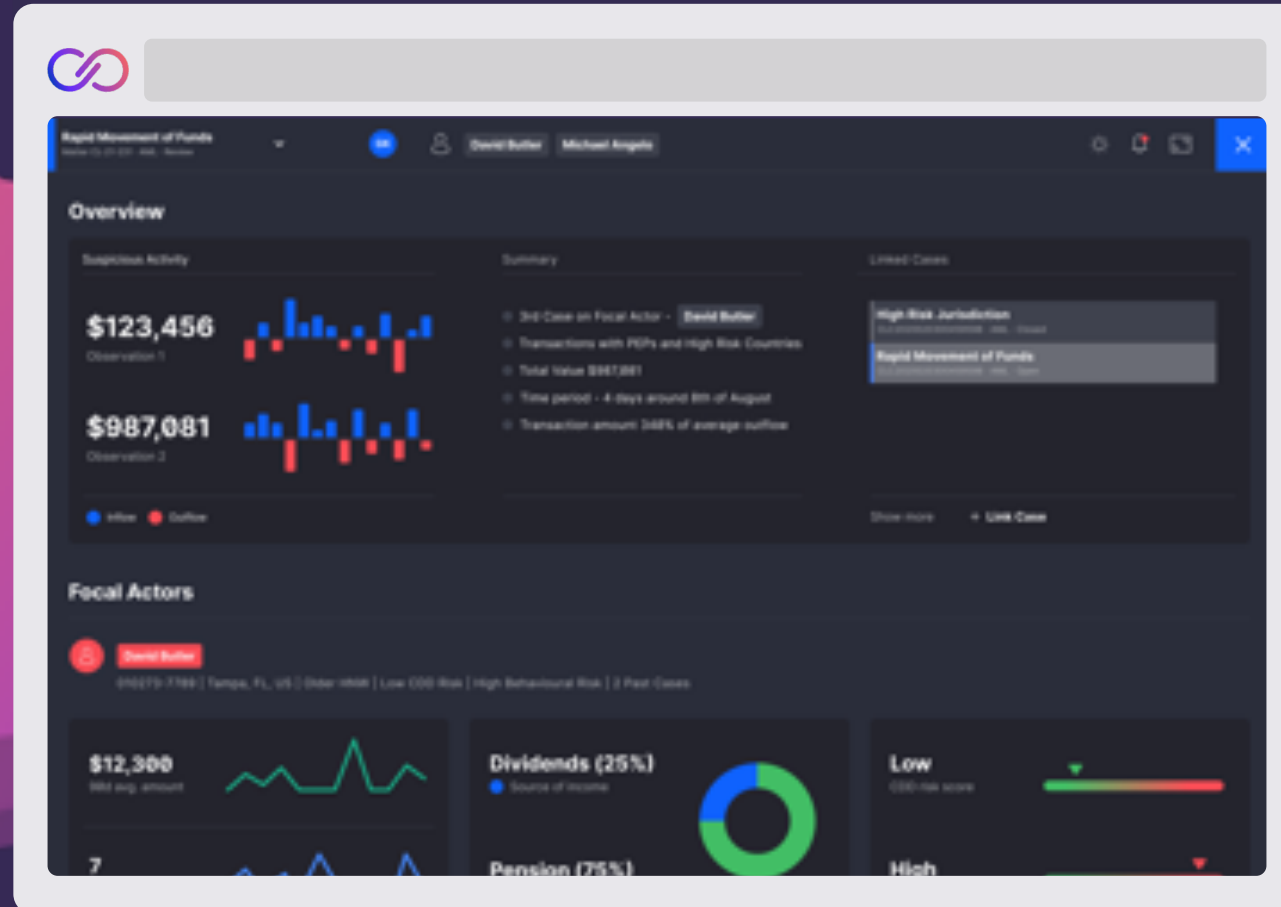
Fiat Transactions

On-chain Analytics

Open Banking Data



Stories



Actors





Observations



Rapid Movement of Funds

Not Reviewed | David Butler | Arkell Charles | Taylor Joyner | +3 days



The plotted activity occurred on April 11 for 34 days totaling **\$587,881**. The activity consisted of **18 transactions** from David Butler, the focused actor to beneficiaries Taylor Joyner and Shalee Corp Inc.

Associated Transactions by Date

04/04/2016, 16:11:29	\$1,098.88	Deposit from Christian Russell an individual in IT	
04/04/2016, 16:11:29	\$54.55	Deposit return from Arkell Butler an individual in KM	Risky Country
04/04/2016, 16:11:29	\$1,098.88	Payment to Shalee Corp. a Legal Entity in IT	Public Person
04/04/2016, 16:11:29	\$1,098.88	Standing order to Larissa Ingram an individual in US	
04/04/2016, 16:11:29	\$1,098.88	Rental income from Christian Russell an individual in IT	

Behavioral insights



LUCINITY



Search bar

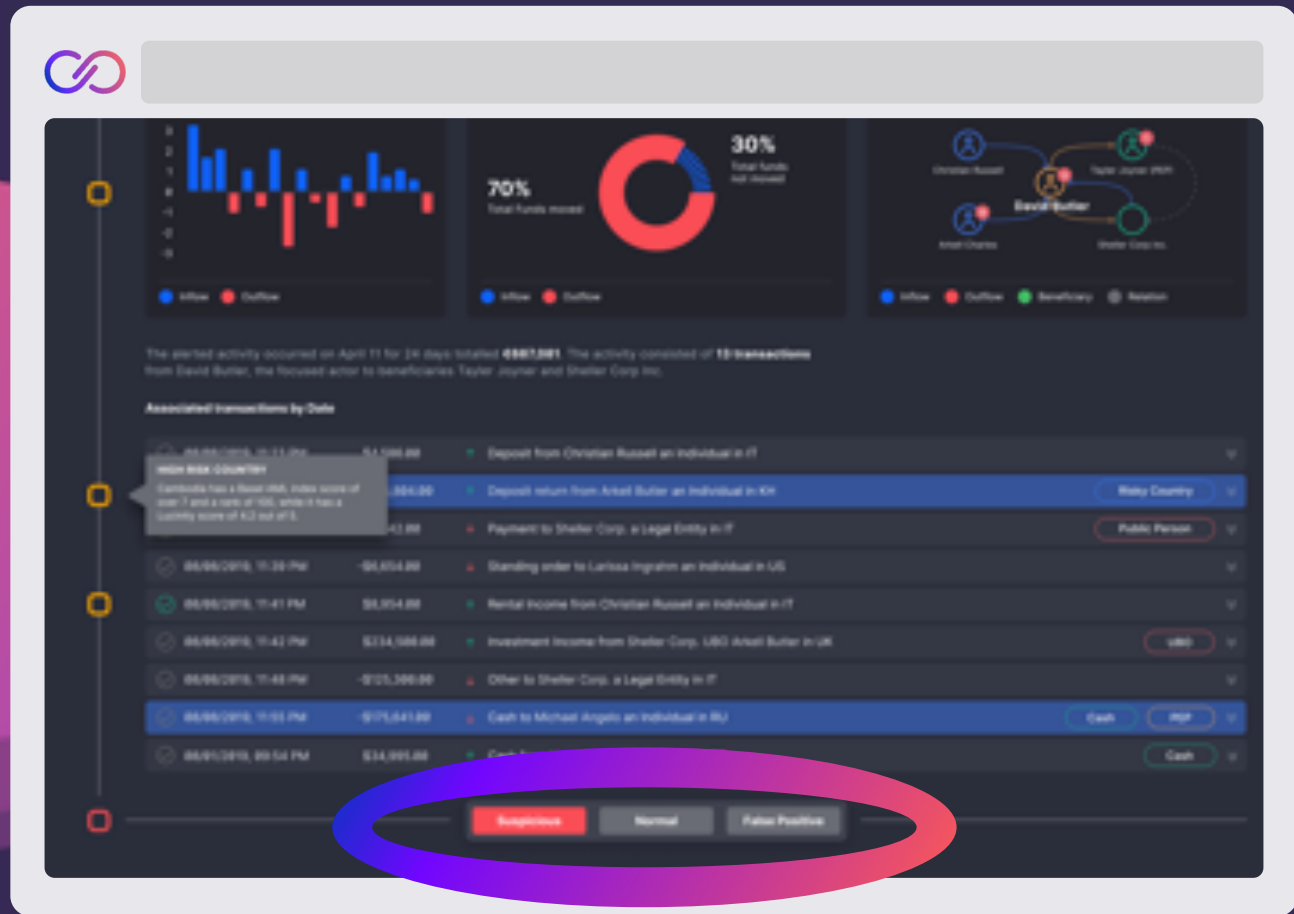


4X

increase in true cases



LUCINITY



Customizable
interface

Continuous improvement
through
user feedback

That's how we **empower** data driven decisions
in the fight against money laundering
to create a better economy

Thank you



[Lucinity.com](https://lucinity.com) | hello@lucinity.com

Confidential & Copyright © 2018-2021 Lucinity Group ehf. All rights reserved.

Lucinity, ClearLens & Make Money Good are registered trademarks of Lucinity ehf

