Cabinet Office

# HMRC Data Innovation & Capability in Fighting Tax Fraud

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structure
trends
exploitation
analyst
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compliance
analysis
tax
BIG
natural
duty
algorithm
data
profile
DATA
artificial
insight
customs
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language
processing
database
taxpayers
Intelligence

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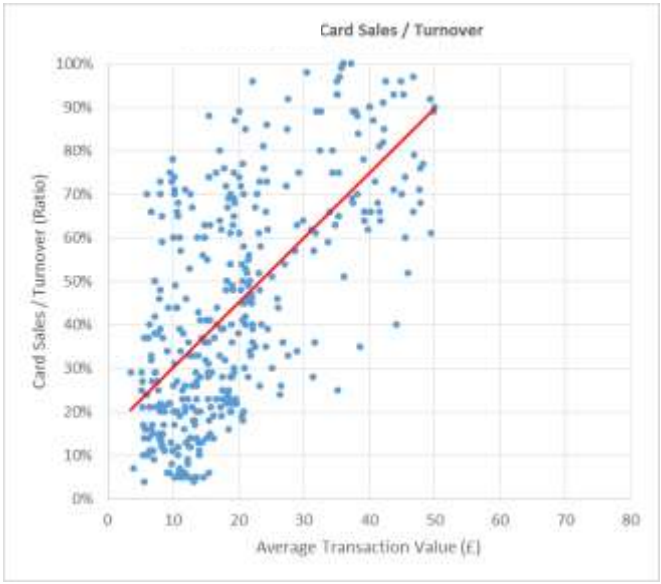
# Exploiting Data to Combat Tax Risk

Risk Strategy

Identifying populations

Targeted Intervention

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# Using Data to Develop Strategy

This presentation covers how HMRC uses data at a strategic level to tackle compliance risks and threats to the UK tax base.

I'll cover:

- ❑ The Strategic Picture of Risk (SPR)
- ❑ How we build the products
- ❑ How we use our analytical insight

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# UK Tax Gap at a glance

## in 2017-18

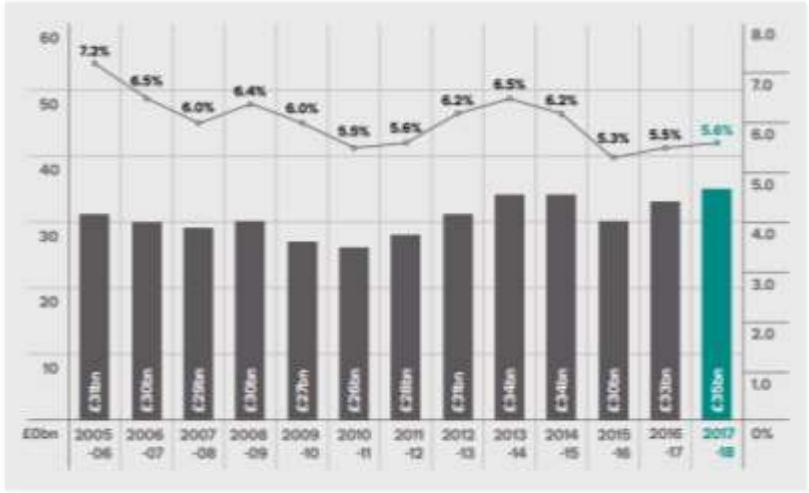
The tax gap is estimated to be **£35 billion**, 5.6% of tax liabilities. It's the difference between the amount of **tax that should be paid** to HMRC and **what is actually paid.** We publish the tax gap.

Why measure it? Tax gap analysis helps us to **understand the losses** in the tax system.

The Strategic Picture of Risk is HMRC's top level assessment of strategic compliance risks, highlighting their **scope**, **scale** and **impact.**

We do not publish the SPR.

Tax gap and percentage of liabilities: 2005-06 to 2017-18




Value of the tax gap: 2017-18

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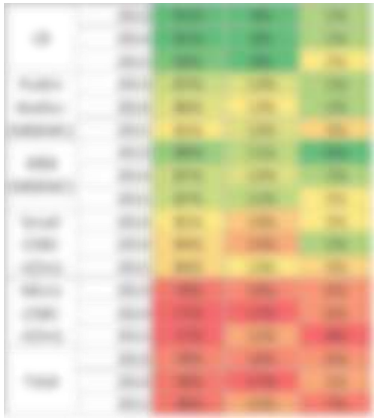
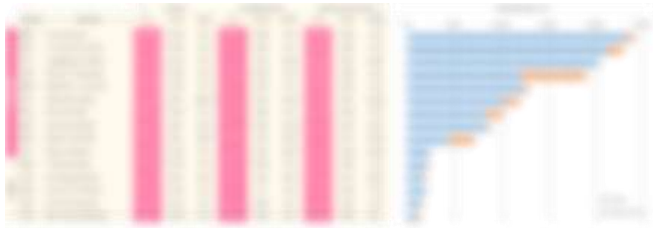
# What is the SPR?

Examples of SPR **visualisations**





Visuals intentionally blurred for data security reasons

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# Population Analysis

- Some slides on tactical analysis
- Sector based
- Risk Based
- Geography Based

# Location Location Location

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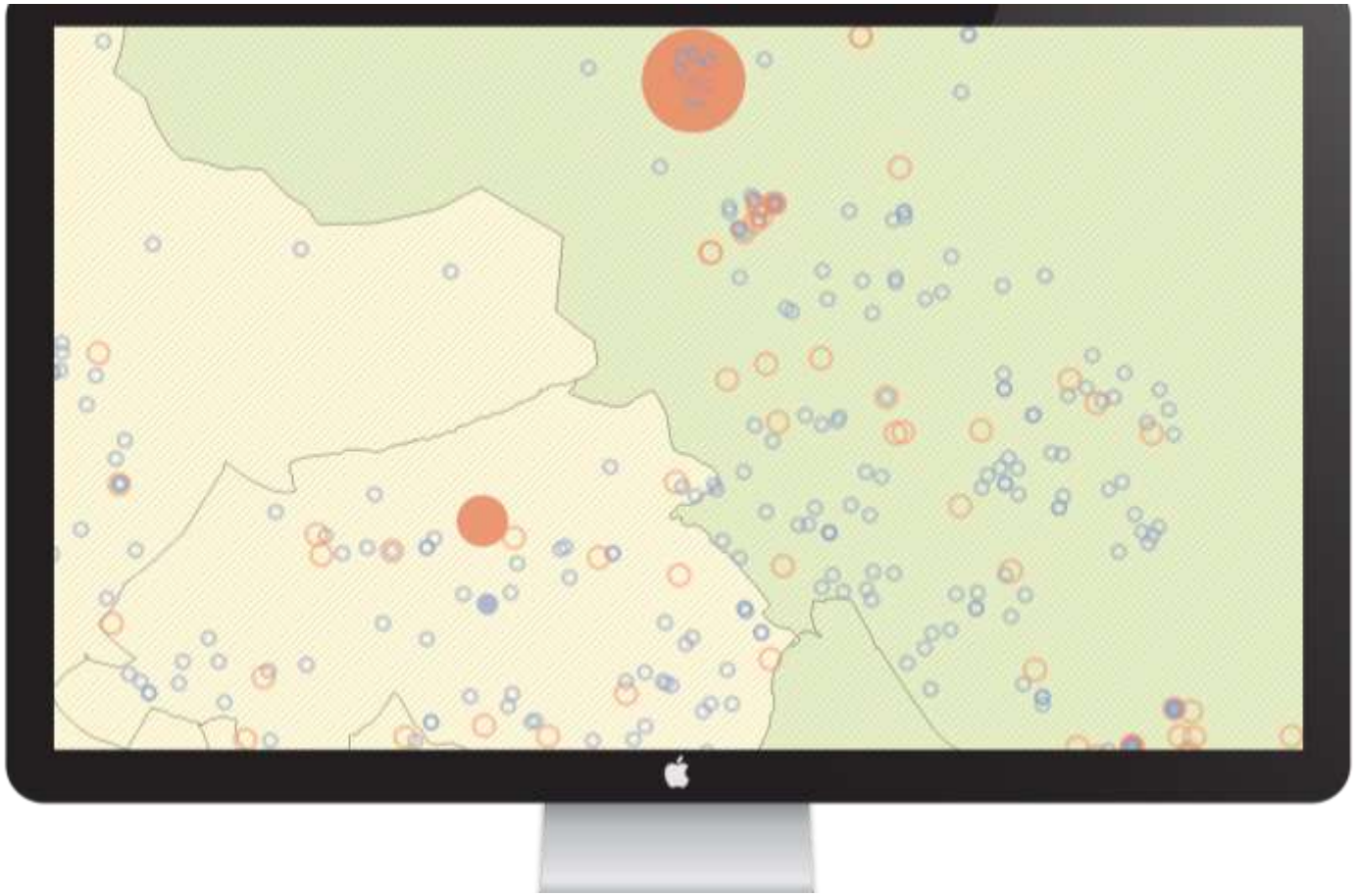
# Location Location Location



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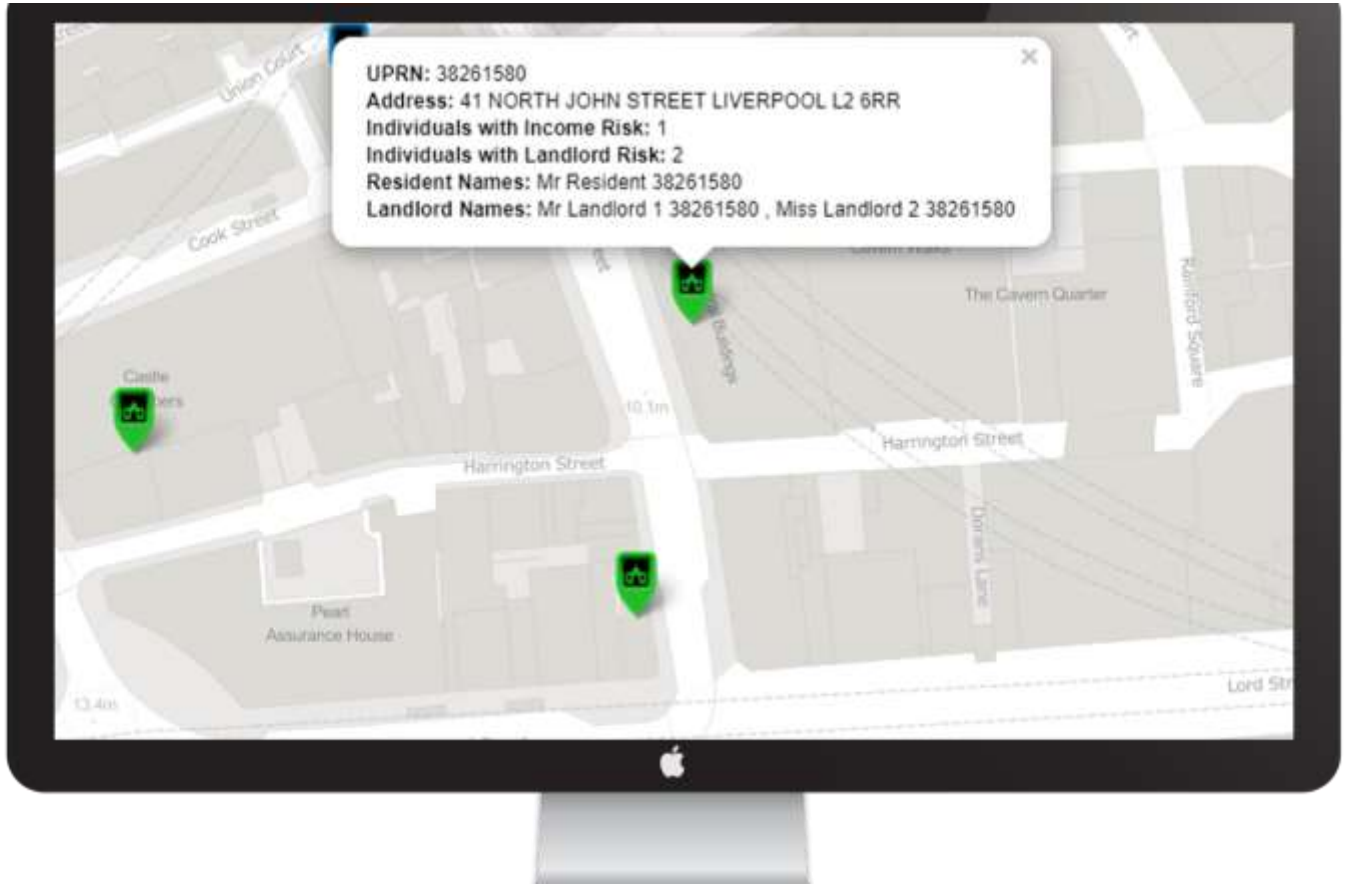
# Location Location Location

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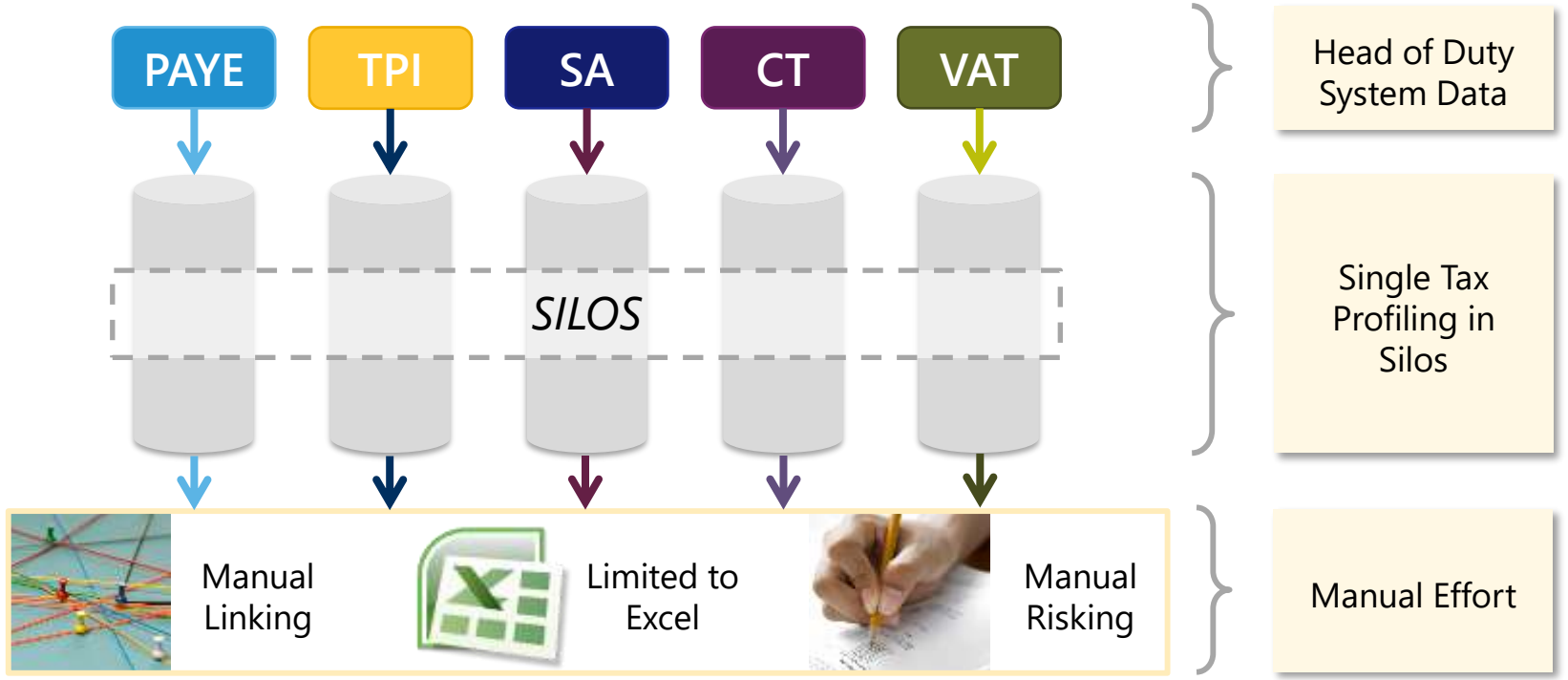
# Data Driven Compliance

- Connect
- Risk rules
- Predictive models
- Exploiting Intelligence
- Supply chains

# Before Connect: "The Old Way"



# Connect: Entities

Examples of entities we can search for and work with

People

Addresses

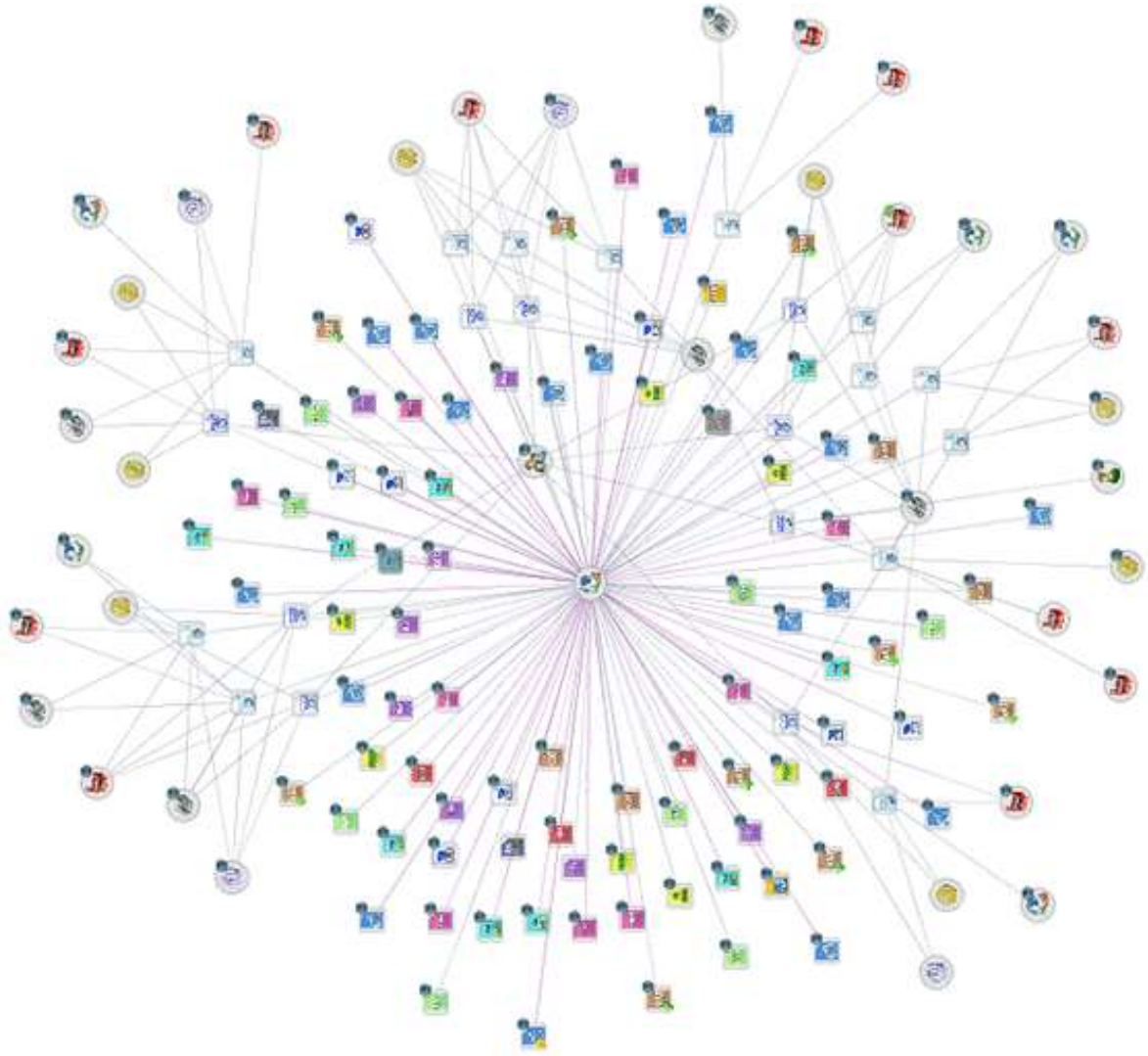
Telephones

Businesses

Accounts

Email Addresses

# Connect begins to organise the linked data



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# Connect: In Numbers

- Underpins the majority of HMRC's compliance activity
- Detecting & preventing payment of over £500m fraudulent repayments per annum
- Delivers £1.2bn yield per annum
- Over 28 billion rows of data which can be analysed at the touch of a button

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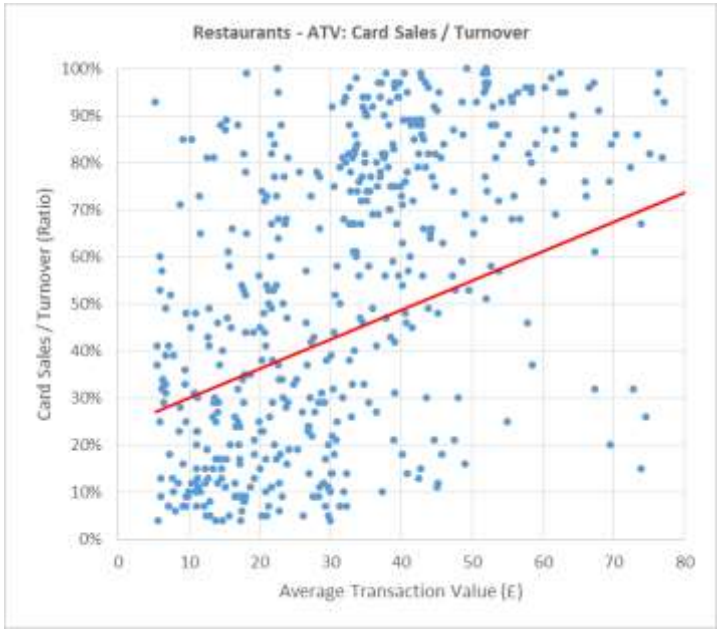
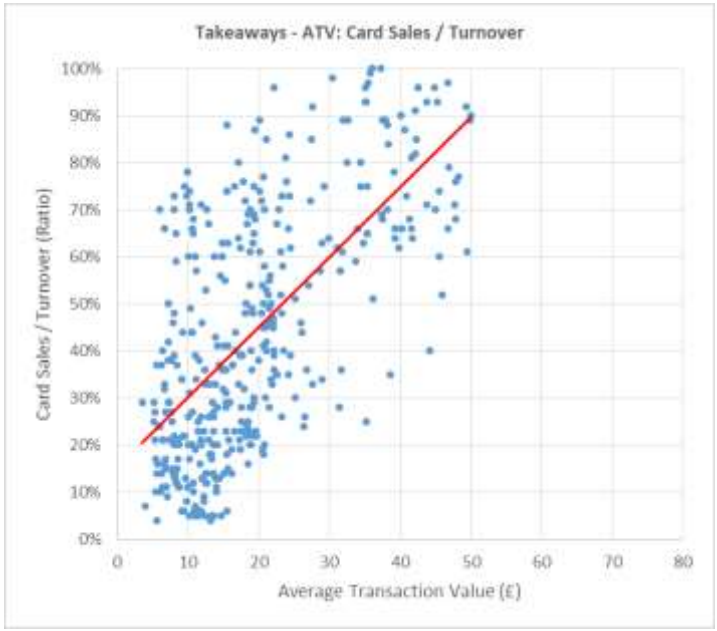
# Merchant Acquirer Data – Regression Analysis

- Univariate Linear Regression (Forward Selection)
- Impact through Analysis: Data-Insight facilitating Operational Delivery



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# Merchant Acquirer Data – Stakeholder Engagement

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# Merchant Acquirer Data – Summary

- Data acquisition has facilitated the targeting of evasion in both the Formal and Hidden Economy.
- Modelling each of the key variables that impact card utilisation is fundamental to assessing risk:
    - Average Transaction Value (ATV)
    - Geographical Location
    - Nature of Trade
    - Size of Business
- Dynamic Benchmarking enables HMRC to tailor of our compliance response to the level of perceived risk.
- Merchant Acquirer Data has improved Hit-Rate across our Taskforce projects and supported the identification of £475m in Pipeline & Closed Case Yield.

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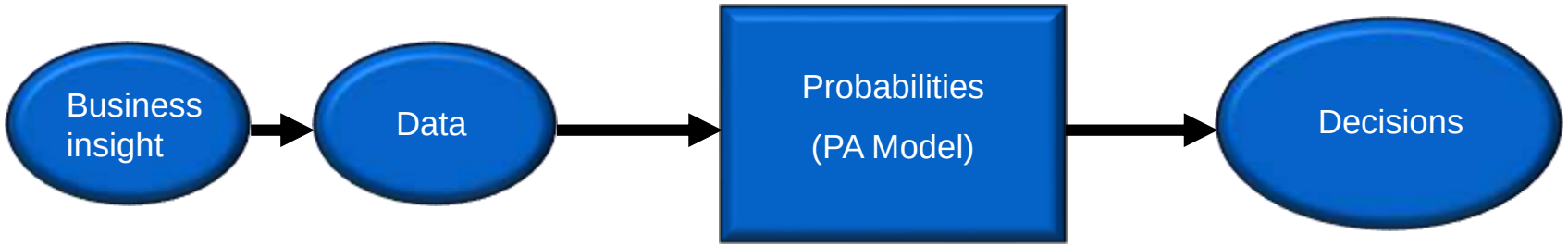
# What is Predictive Analytics (PA)?

- Using knowledge of Population + Outcomes = Data driven decisions
- Way of generating single measure of an individual's/entities risk
- Type of Machine Learning - models improve with experience
- Pattern recognition – looking for anomalies and trends in transactions

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# Common PA examples

- Online dating
- Insurance quote
- Mortgage/Loan application
- Health check
- Online shopping

and in HMRC**…Compliance Risk Models**

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# Predictive Analytics in Compliance – Key Stats

Predictive Analytics is used to identify non-compliance to reduce the tax gap

**c12 PA models**

covering VAT, ECPA, ITSA & CT

**10%** estimated performance uplift in hit rate when a new model is deployed

**£300m** yield from face-to-face Compliance interventions enabled by PA risk products

**2.1mn**

VAT population – PA models cornerstone of all VAT risking

**£2m** efficiency savings in our risk processes enabled by PA in the last 18 months

**36k cases**

covering VAT, ECPA, ITSA & CT

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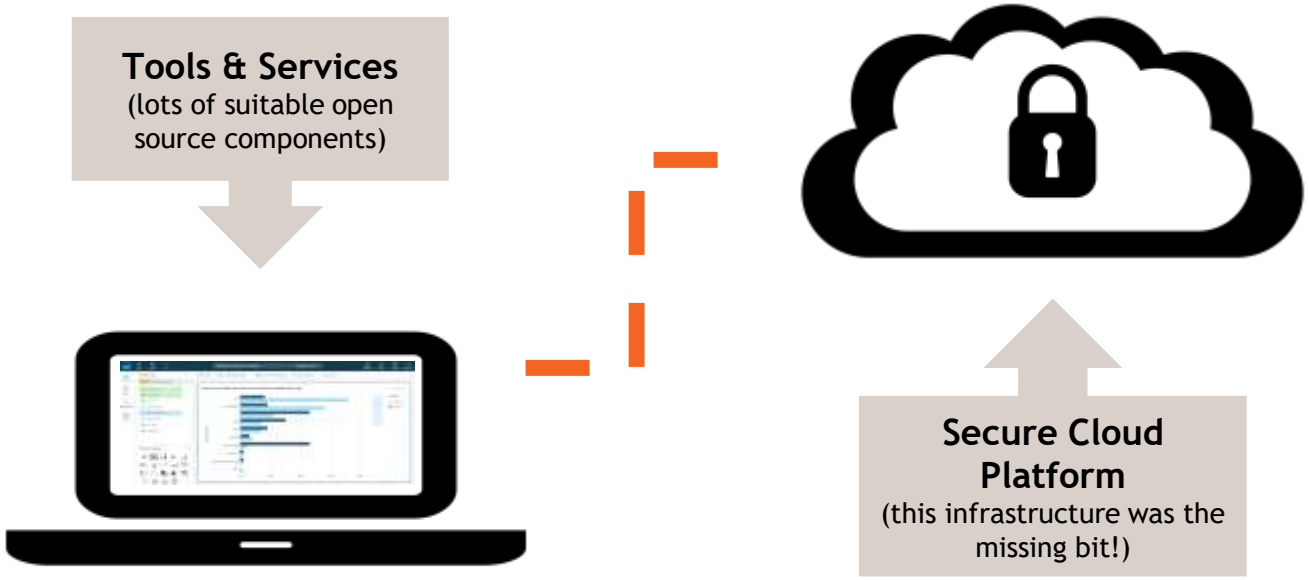
# Exploiting Intelligence

# Exploiting Intelligence

*"Enable analysts to analyse by bringing tools, computing power and operational data together"*

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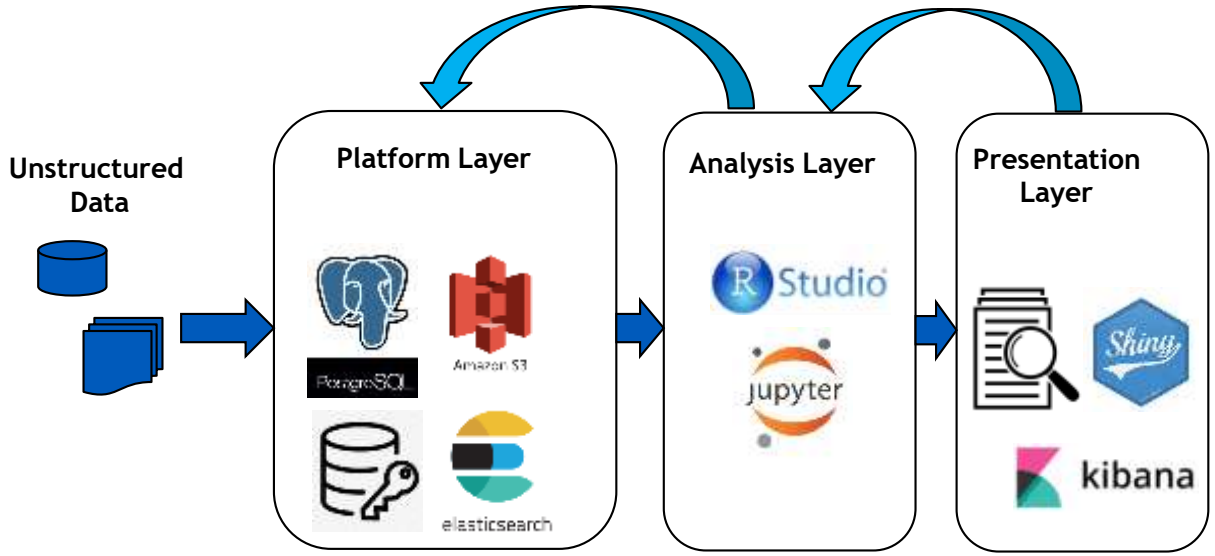
# Exploiting Intelligence

## Full Pipeline

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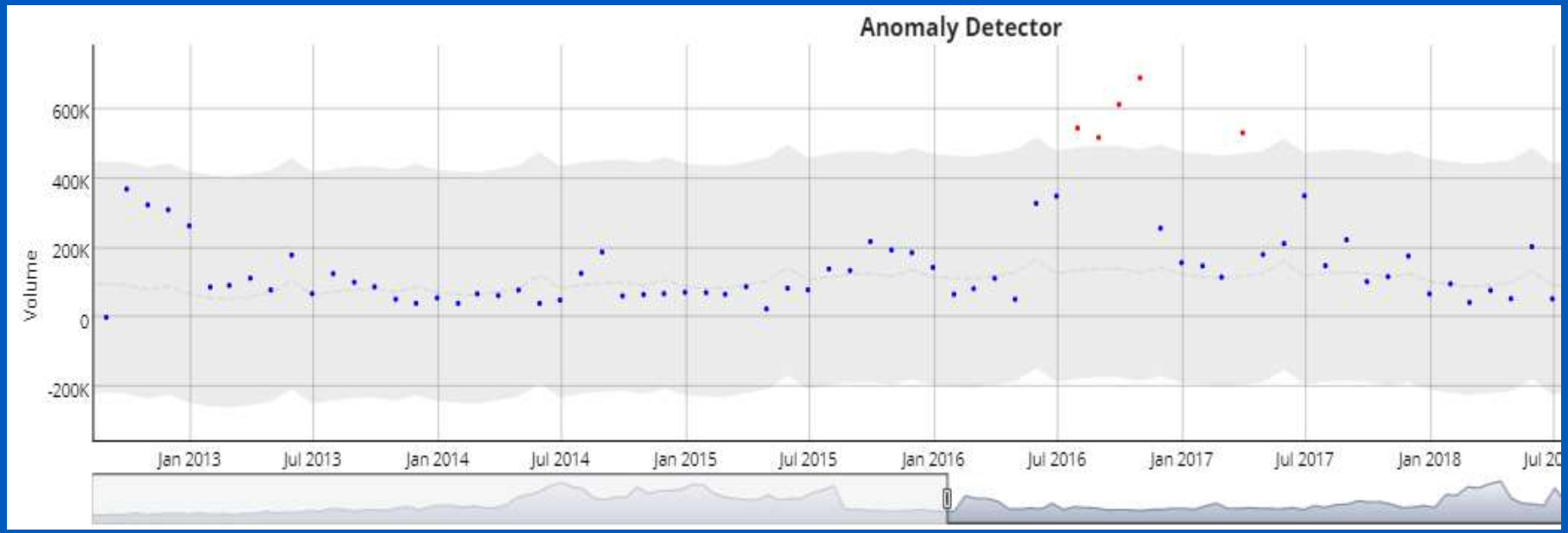
# Registered Dealers in Controlled Oils

Criminal misuse of red diesel and heating oil



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# Registered Dealers in Controlled Oils

Criminal misuse of red diesel and heating oil

## Cluster Summary

Show 25 entries

| cluster | clust_n | non_comp | tot_tput | gas_box1_sup | gas_box2_sup | gas_box3_sup | gas_box4_sup |
|---|---|---|---|---|---|---|---|
| 13 | 285 | 12 | 946896 | 0.005472 | 0.02451 | 0.02174 | 0.446 |
| 10 | 571 | 9 | 71272 | 0.004112 | 0.4646 | 0.002339 | 0.003937 |
| 7 | 326 | 6 | 3009534.5 | 0.01069 | 0.008328 | 0.01431 | 0.07997 |
| 1 | 137 | 2 | 34132 | 0.00003353 | 0.0307 | 0 | 0.000007999 |
| 8 | 416 | 2 | 38999.5 | 0.01027 | 0.2094 | 0.00356 | 0.01247 |
| 15 | 167 | 1 | 205551 | 0.005786 | 0.2484 | 0.007622 | 0.01322 |
| 2 | 27 | 0 | 23313316 | 0.0001181 | 0.007267 | 0.1986 | 0.0274 |

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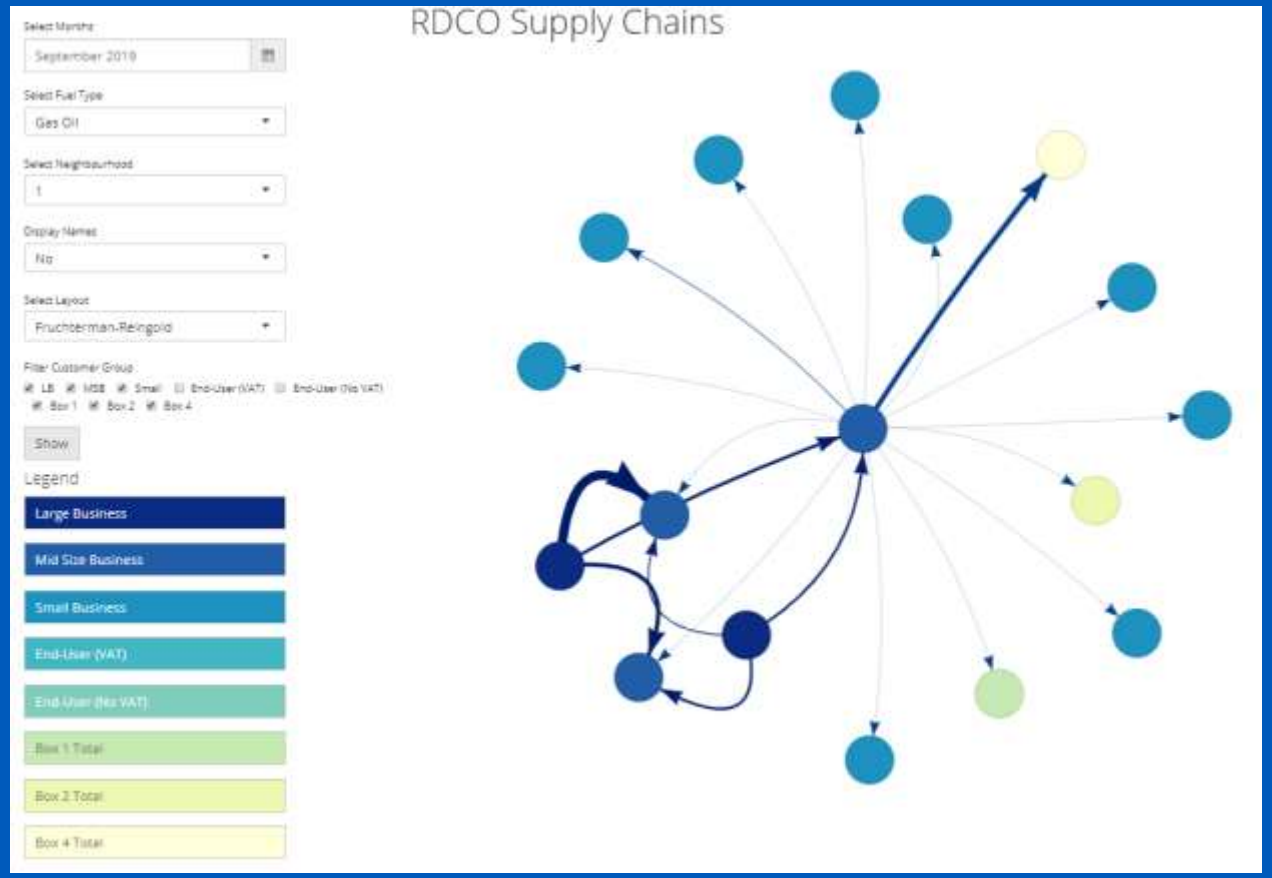
# Registered Dealers in Controlled Oils

## Criminal misuse of red diesel and heating oil



# Thank you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