



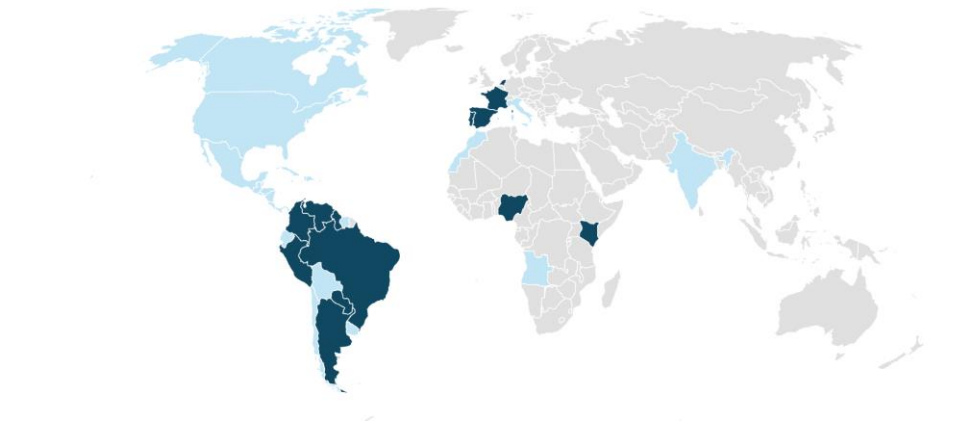
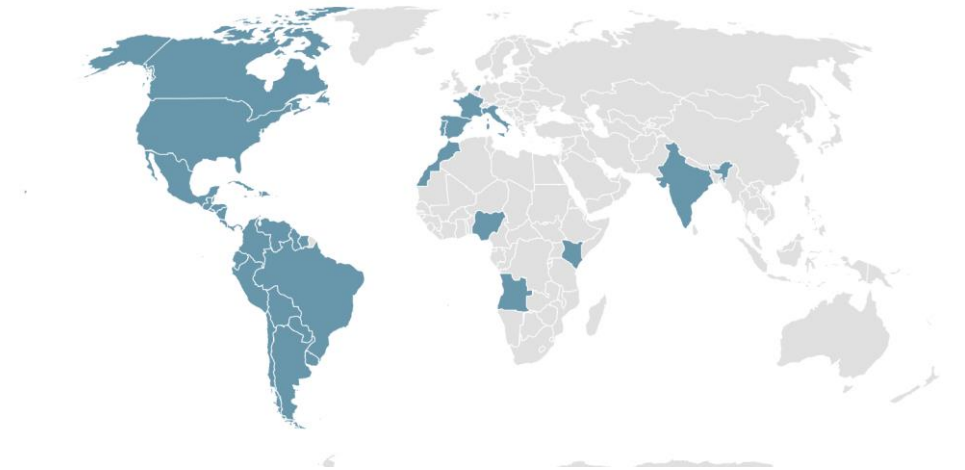
CIAT – Advanced Analytics Center.

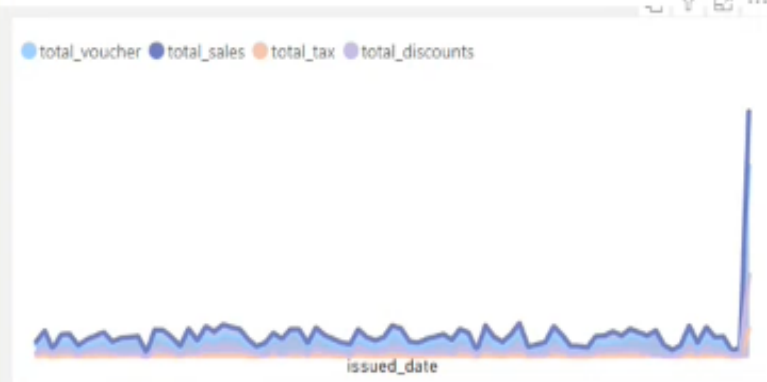
ADSD

Raul Zambrano
Director of Technical Assistance and Innovation
CIAT
November 2024

About CIAT

- Regional International Organization founded in 1967
- 42 member countries
- What we do
 - Cooperation among tax administrations
 - Studies
 - Publications
 - Training
 - Technical Assistance
- Advanced Analytics Center
 - Why
 - How





Annual taxable operation



total_voucher versus total_sales by month



total_sales versus total_tax by month



total_discounts versus total_tax by month



Supply chain analysis

13.14

pagerank_score

8	8
min_distance_from...	min_distance_from_cus...
16	4.00
min_depth_of_sup...	min_place_in_supply_ch...
48.00	6.68
max_distance_from...	max_distance_from_cus...
6,688.00	0.06
max_depth_of_sup...	max_place_in_supply_c...

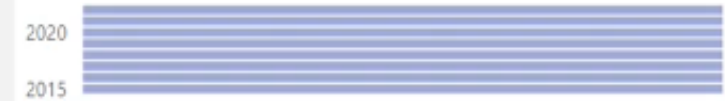
315 total_suppliers

674 total_buyers

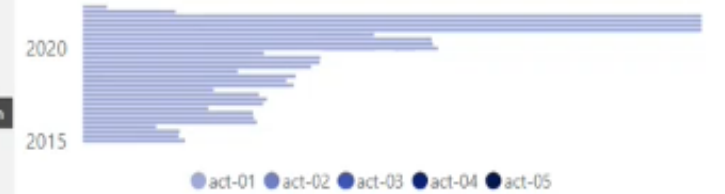
Commercial activity indicators

- 10 number_of_transactions_to_self
- 91.06K total_voucher_to_self
- 26.20 ratio_sales_purchases
- 1.44K ratio_sales_employees
- 29.41 ratio_buyers_suppliers

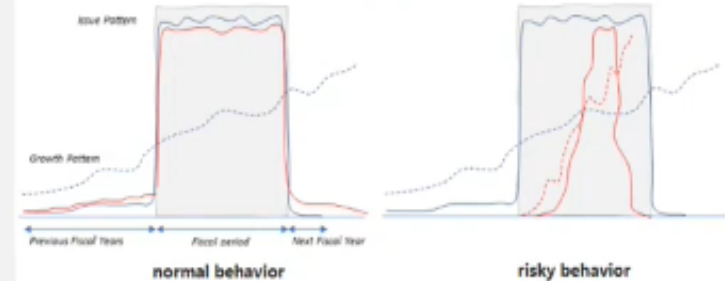
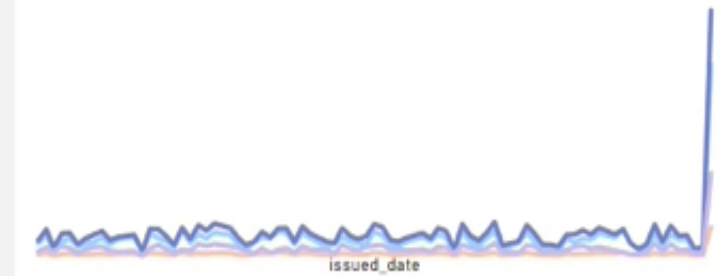
Registered economic activities by year



Operational economic activities by quarter

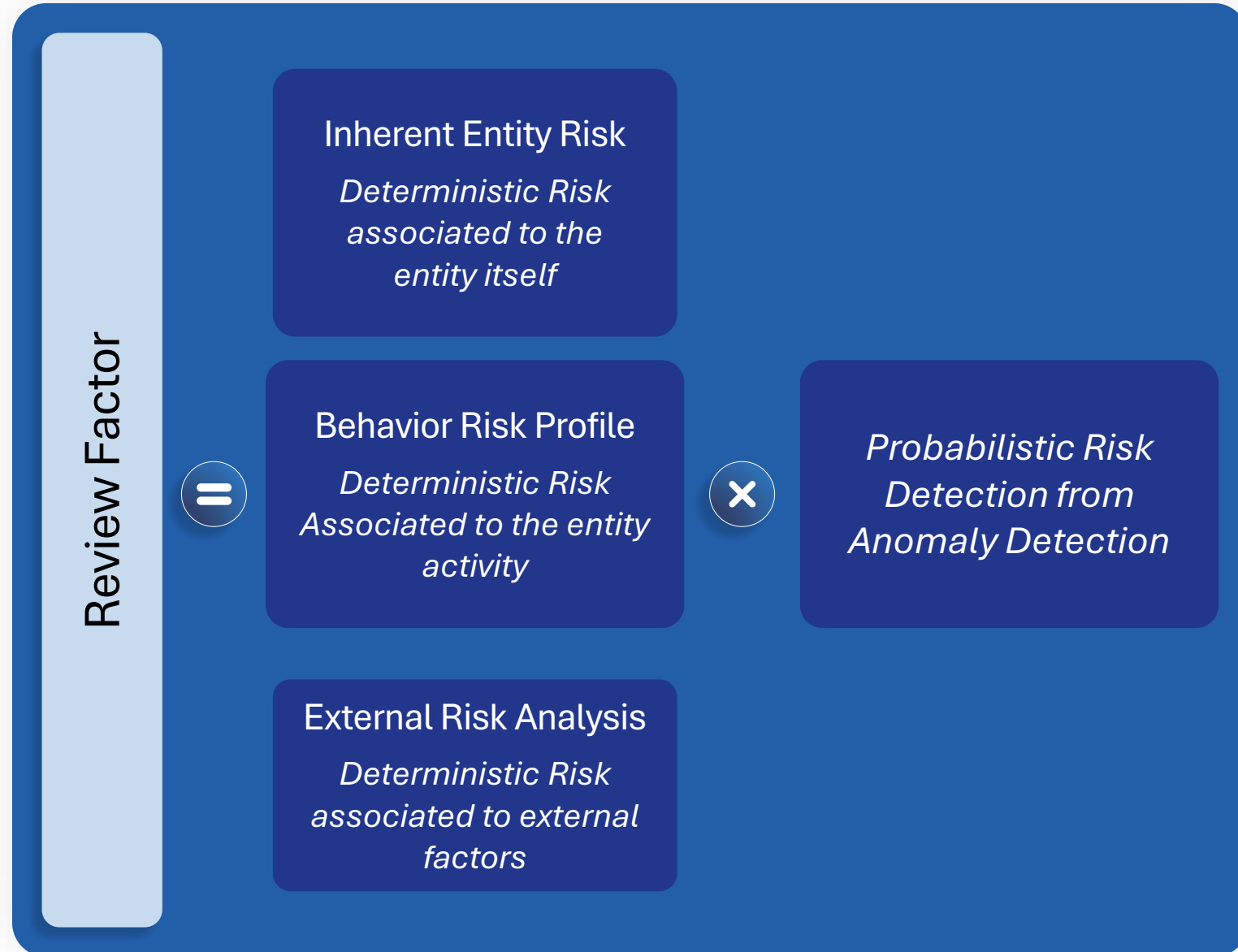


total_voucher total_sales total_tax total_discounts



Comprehensive risk calculation approach from ADSD

First testing
Guatemala
Costa Rica



Use Case for anomaly detection

Requirements



- Ability to analyze government transactions
- Ability to spot new abnormal patterns
- Ability to present complex big data in an easy to interpret and actionable manner

Challenges



- Millions of government transactions collected daily
- Batch processing reduces speed of anomaly detection and intervention
- Risk-analytics at scale

Typical scenarios



Customs undervaluation of goods and misclassification



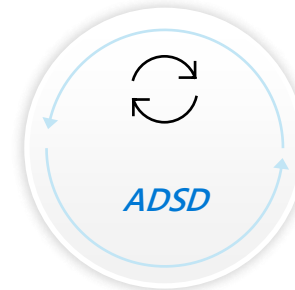
VAT Fraud Detection



Benefits and health services misuse



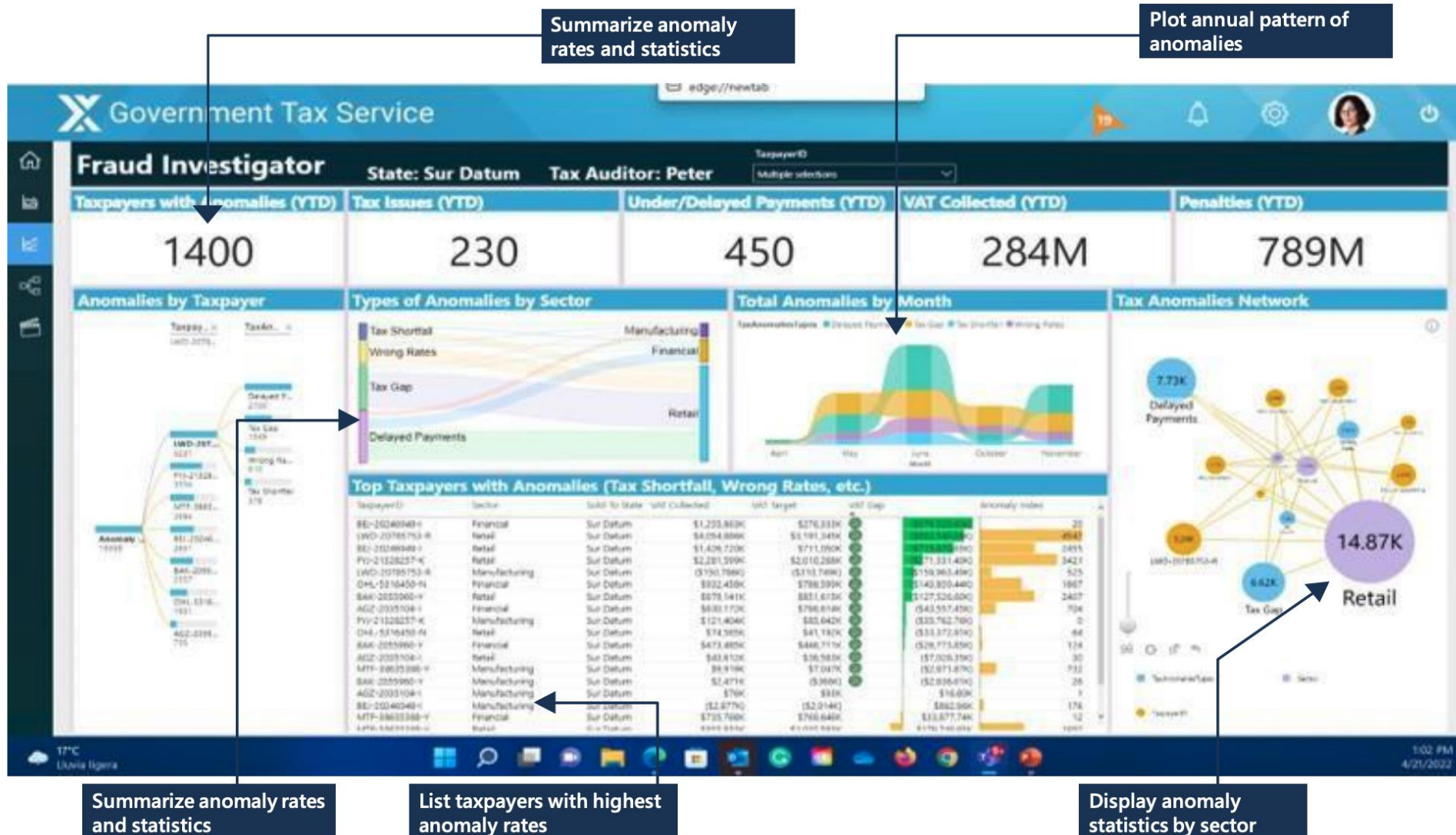
Permits and Grants fraud



Identified Anomalies

Iterative ML pipeline uncovers anomalies at scale, producing results quickly, allowing fast analysis with easy-to-use tools.

ASDS





Thank you
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