



## Real-time Risk Detection

### Addressing the challenge of false positives using machine learning

#### OVERVIEW

The combination of legislation, market dynamics, and increasingly sophisticated risk management strategies requires you to be proactive in detecting risks like fraud quicker and more effectively. Dynamic detection systems need to adapt to evolving compliance regulations, scale to deal with growing transaction volumes, detect sophisticated risk specific patterns, and reduce false-positives. TIBCO's Risk Management Accelerator uses a combination of predictive analytics, streaming analytics, and business process management to deliver a powerful and cost-effective system for detecting anomalies.

#### COST OF FRAUD

In 2016, financial fraud losses in the UK alone, across payment cards, remote banking, and checks totalled £768.8 million, an increase of 2% year-on-year. Payment card fraud made up 80% of the total, and of that, almost two thirds was remote-purchase fraud. In 2016 the industry prevented £1.38 billion of attempted fraud.

#### BUSINESS SCENARIO

Strict regulations exist to ensure orderly and trustworthy markets, which means that risk needs to be managed to ensure compliance. Couple this with the challenge of detecting and preventing criminal exploitation of the markets and payment systems, and it becomes imperative that all financial institutions mitigate their exposure. To do this you have to use tools for trade and payment transaction surveillance that can discover fraudulent or non-compliant events.

Today's dynamic detection systems need to be agile, scalable, and intelligent:

- Agile to adapt to ever-evolving compliance regulation
- Scalable to deal with ever-increasing data volumes
- Intelligent to detect increasingly sophisticated patterns and reduce false-positives in the alerting stage

Coupled with the detection system, an essential component is case management. Taking an alert from when it is raised through to the investigation stage, and if applicable onto the regulator, requires a capable and integrated case management tool, which can capture all the inputs from historical data, surveillance analyst notes, and transaction log extracts.

### FALSE POSITIVE RATIO

The big problem with all detection systems is the number of valid transactions that are flagged. Get the false-positive ratio too high and you dramatically increase the cost of investigation, get it too low and you risk regulatory non-compliance fines that could be into the millions of dollars.

### TIBCO ACCELERATORS

The TIBCO Community is an invaluable resource containing a vast array of prebuilt working examples of problems solved with TIBCO products. The accelerators are more than just a simple example and offer a whole infrastructure not just a simple code extract. Check out the Exchange on TIBCO Community. <https://community.tibco.com/wiki/accelerators>

### COMPONENTS

TIBCO software products:

- TIBCO ActiveMatrix® BPM
- TIBCO StreamBase®
- TIBCO® Live Datamart
- TIBCO Spotfire® Server
- TIBCO Spotfire® Data Science
- TIBCO Spotfire® Statistics Services

### CONCEPTS

Anomaly detection spans many domains, including:

- Anti-money laundering (AML)
- Trade surveillance
- Credit and debit card monitoring
- Health insurance fraud
- Insurance fraud
- Online operations

The commonality among these is a high frequency of data points, at which any given time a certain percentage could be classified as anomalous. The percentage will vary greatly by market, industry, value, and other parameters, but the key to surveillance systems is to maximize identification of anomalous data points and minimize false-positives. That would provide an optimal system for both operations and financial purposes.

Machine learning is a branch of artificial intelligence that, through use of algorithms, allows computers to detect patterns in data and automatically adapt as the patterns evolve. When leveraging machine learning in risk scenarios, businesses can both efficiently spot the riskiest data and understand the drivers of that risk, which allows creating policies for combating it effectively, boosting business efficiency and productivity.

### BENEFITS AND BUSINESS VALUE

Regulation and potential fines aside, it is in the best interest of market participants to adopt and mature some form of surveillance to enhance visibility and transparency.

TIBCO's Risk Management Accelerator brings the following key benefits:

#### FASTER TIME TO RESOLUTION

- Data discovery, statistical model creation, and integration within a single tool that can co-exist with and augment existing risk management solutions.
- Dashboards that integrate data across databases (historical and reference data) alongside information from real-time processing. Users can filter, slice and dice, and zoom in and out of data to determine if the alert needs further investigation or can be discarded as a false-positive.
- The ability to score data points in real time.

## ACCELERATE ADOPTION OF SURVEILLANCE

- Surveillance projects can span multiple assets, data, and scenarios, from monitoring abuse in cash equities to complex schemes involving foreign exchange (FX) and derivatives.
- With connectivity to over 150 data sources, including Bloomberg, BM&FBovespa, Currenex, EBS, FIX, FXall, Hotspot, Interactive Data, and Thomson Reuters, all your data feeds can be incorporated.
- Graphical flow-based development reduces complexity and increases collaboration.

## FLEXIBLE SURVEILLANCE SCENARIOS

- The accelerator's predefined abuse scenarios adhere to published regulator specifications; however, it is common for each institution to tailor the thresholds that trigger the alerts and exclude certain events from the analysis altogether.
- Correlation to detect when complex potential abuses on one asset type are being attempted on a related instrument of another type.

The accelerator achieves this with three steps:

- Using the TIBCO® Enterprise Runtime for R (TERR) engine for the R language, TIBCO Statistica™ platform, or TIBCO Spotfire® Data Science analytics, historical datasets are analyzed and predictive analytics models created that capture patterns in the data. Then, users can run “what if” scenarios within Spotfire® to fine tune the model to meet their needs.
- Next, the model is applied to the streaming machine learning engine to score incoming real-time transactions and flag them with accompanying contextual data.
- Finally, Business Process Management cases are generated to manage anomalous event processing, provide an audit trail for regulatory compliance checks, and analyze the case handling process.

## TECHNICAL SCENARIO

### CAPABILITIES

Data is analyzed against both a supervised and unsupervised model to produce a score that indicates the probability of fraud and another score that shows how the transaction deviates from normal, also known as an oddity.

When a transaction is scored, it either passes or is flagged as probable fraud, as an odd transaction, or both. By scoring transactions as they happen, you can respond to raised alerts provided by an event processing platform and create a case that facilitates the investigation of potential fraud.

With a capable and integrated case management tool, you can take an alert from when it is raised through the investigation stage, and if applicable, onto the regulator. You can also capture inputs from historical data, surveillance analyst notes, and transaction log extracts to determine what is fraudulent and what is not.

### HOW WE ARE DIFFERENT

We detect fraud by using a combination of event processing and analytics rather than a series of concrete rules for detection. The agility of these platforms allows you to modify the framework quickly and easily to adapt to other scenarios.

You can justify to regulators how your decisions were made about whether specific events were or were not fraud-related and whether or not to escalate. You can show consistency over time, reasons for changes in approach, and documented changes and approvals.

## PREDICTIVE ANALYTICS

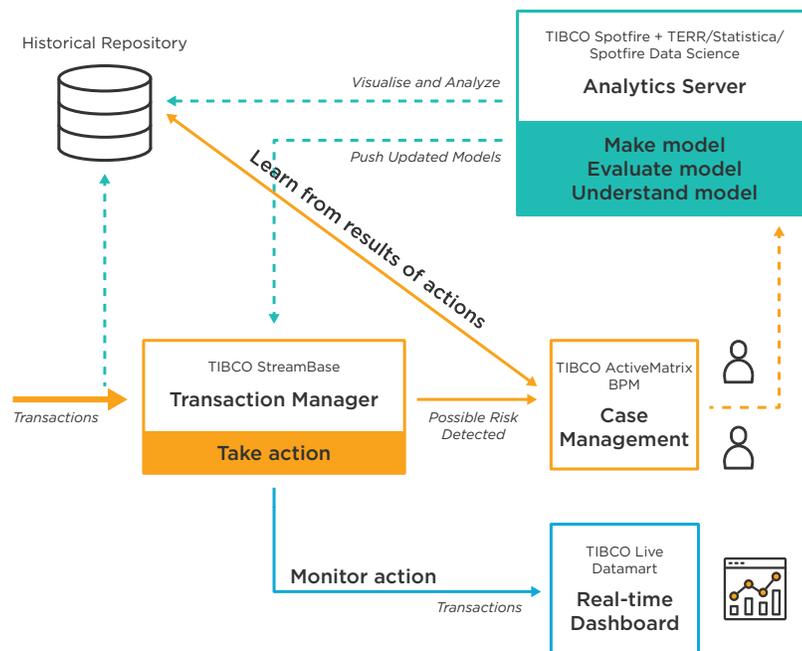
You can quickly and more easily deploy predictive analytics to help with risk management. Developers using the R language can deploy on TIBCO's high-performance enterprise engine for the R language (TERR) without recoding and retesting. TERR is embedded in TIBCO Spotfire® visual analytics, TIBCO Statistica® smart analytics, and TIBCO StreamBase® streaming analytics.

## HOW WE IMPLEMENT IT

The Risk Management Accelerator illustrates a reference architecture that shows how Predictive Analytics, Streaming Analytics, and Business Process Management can collaborate to support the full lifecycle of end-to-end risk detection. The accelerator includes a demonstration for an AML use case to detect potentially fraudulent transactions in a data stream.

The accelerator's demonstration shows fraud detection using a credit card transaction dataset that is analyzed against both a supervised and an unsupervised model. The analysis produces a score that indicates the probability of fraud and another score that shows how the transaction deviates from what could be considered normal.

The accelerator shows a design pattern for detecting anomalies using a combination of event processing and analytics rather than providing a series of concrete rules for detection. The agility of the analytics and event processing platforms allows customers to modify the framework quickly and easily to adapt to other scenarios like trade surveillance, insurance claims, or credit card transactions.



## ADDITIONAL READING

Read more in the [Busting Financial Crime with TIBCO](#) whitepaper.

What if you could use just one financial crime fighting solution that would empower your business users to improve handling of financial crimes such as anti-money laundering, credit card fraud, trade surveillance, or medical fraud?

See more in the [Get Ahead of Fraud Infographic](#) ...taking an algorithmic approach.



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