Increase Effectiveness in Combating VAT Carousels
Detect, Prevent and Manage
## Contents

Overview ......................................................... 1  
The Challenges ............................................... 1  
Capabilities ................................................... 2  
  Scoring ....................................................... 3  
  Alert and Case Management ......................... 3  
  Special Investigation ................................. 4  
  Management Information and Analytics ........... 4  
  Hybrid Detection Model ......................... 4  
  Social Network Analysis ......................... 5  
  Automated Business Rules ......................... 5  
  Anomaly Detection ................................. 6  
  Predictive Modeling ................................. 6  
  Text Mining .............................................. 6  
The Benefits .................................................. 6  
Learn More .................................................... 8  
End Notes ...................................................... 8
Increase Effectiveness in Combating VAT Carousels

Overview

VAT Carousel fraud, also known as ‘missing trader intra-community’ (MTIC) fraud, is an ever increasing cost for European countries, as underlined by the current VAT gap for the EU, which is estimated at 107 billion euro, of which 42 billion missing euro are due to VAT Carousels. Unlike other forms of tax evasion, such as the ‘hidden economy’ where the lost tax revenue remains within the economy, VAT Carousel fraud will often drain large sums of money out of the country itself.

In Algirdas Semeta’s speech at the European Serious and Organised Crime Conference³, he said “We estimate that about 40 per cent of all damage caused to the EU budget by fraud is linked to organised crime … It is difficult to estimate the total impact of VAT fraud. However, according to our approximate calculations, the VAT gap for the EU would be close to 12 per cent of the theoretical VAT liability. This is equal to approximately €107 billion.”

At the European Council meeting on 22 May 2013, taxation was high on the agenda, and members were urged to give their focus to tackling VAT fraud and given clear deadlines for doing so.

As stated in the European Council Conclusions Report³ – “In times of tight budgetary constraints, combating tax fraud and tax evasion is more than an issue of tax fairness – it becomes essential for the political and social acceptability of fiscal consolidation.”

Setting up an early warning system for VAT Carousel fraud is a critical part of the Action Plan. A number of tax authorities have made early moves to address the problem and are already beginning to see very significant benefits as a result. This paper outlines the learning and critical success factors identified by SAS in the work it has been doing with these pioneering tax authorities.

The Challenges

Although progress has been made by some of the leading tax authorities, the complexity of the nature of the fraud has made it difficult for authorities to rapidly mobilise their current operations in order to have a systematic approach to detect, prevent and manage VAT Carousel fraud. To help them in their task, SAS has been working with the more progressive tax authorities and has been able to “package up” an approach for dealing with these challenges:

- **Complexity:** The nature of the fraud requires a system to be able to identify the linkages between the chains of business involved in the fraud. Detecting fraudulent networks requires the analysis of millions of taxpayers, VAT returns and intra-community transactions.
- **Speed:** Unlike the traditional process of tax returns, where authorities potentially have years to recover the tax, VAT Carousel fraud is a high velocity fraud, and stopping the losses requires a fast response.
• **Limited analytic capabilities:** The inability to perform sophisticated analysis of transactions in order to identify suspicious companies, relationships and behaviours makes authorities susceptible to organised crime.

• **Manual processes:** Manually gathering and preparing data for fraud detection is time-consuming, tedious and highly error-prone; even traditional tools require a long time to process. Such processes typically require a suspicion of risk in order to initiate an investigation, as it is not possible to scan all of the data.

• **Limited resources:** Government human resources dedicated to prevent, detect, investigate and prosecute fraud and abuse cases are subject to attrition and are very limited.

• **Chasing money after the event:** Once missing traders are detected, it is very difficult to recover the money and authorities need to ensure they invest in capabilities to prevent fraud escalation.

**Capabilities**

Working closely with government departments and financial institutions, the SAS® Fraud Framework has been specifically developed to address the issue of fraud. Built on the most comprehensive set of ‘big data’ tools, the platform is ideally suited for the detection of VAT Carousel fraud, as well as many other forms of tax non-compliance.

In addition to the many tools provided for customers to detect, prevent and manage fraud, it also provides a range of tax-specific fraud detection models. The broad capability of SAS analytics enables tax authorities to further utilise their investment in the SAS platform in order to address additional optimisation opportunities, such as customer segmentation and contact strategy optimisation, as well as debt collection optimisation.

Before looking at the detailed detection capabilities required for a VAT Carousel fraud management solution, it is useful to understand best practice in the overall concept of managing these types of challenges. Figure 1 provides an overview of the key business cycles involved.

---

Figure 1: Fraud Management – Concept of Operations
Scoring
This is the heart of the detection and prevention engine and is able to process very large volumes of historic data, identifying a range of different fraud modus operandi. It is also capable of scoring specific events, such as applications to create new companies, or payment requests, in real-time or batch. The SAS Fraud Framework uses the industry's most advanced hybrid model for the detection of fraud.

Alert and Case Management
In order to effectively operationalise a fraud detection model, it is necessary to have an efficient environment to triage and perform the initial investigation of the alerts generated by the detection model. This provides queues for investigators to work (see Figure 2) and facilities to quickly see all the data in one place, including the reasons as to why a particular alert may have been raised (see Figure 3). This environment allows basic review and the ability to refer the alert for detailed investigation, or to close the alert.

Figure 2: Investigator Work Queue

Figure 3: Network showing Risky Companies and Transactions
Special Investigation

Once a case has been identified as high risk, a full investigation or case is raised. At this point the investigators have all the data assembled in an environment where detailed exploration can be carried out (see Figure 4). A fraud case management environment can be used to capture the evidence and orchestrate the specific fraud investigation. Crucially, it captures the outcome to ensure that investigated and fraudulent businesses, individuals, addresses, telephone numbers, etc. are captured on the database providing future risk indicators.

Management Information and Analytics

Once the system is operational, it is important to monitor the progress and effectiveness of the detection models and the investigation process. This will allow management to identify if additional analysis work is required to improve models, or the routing and handling of alerts. An environment to perform ad-hoc analysis is also useful to allow the discovery of new modus operandi of the fraudsters.

Hybrid Detection Model

VAT Carousel fraud is one of the most sophisticated fraud types faced by Tax authorities, and as such it needs a comprehensive analytics platform. SAS has utilised its full “Hybrid Model” (see Figure 5) in the development of its VAT Carousel fraud models. It is only through the use of these different combined analysis techniques that these types of fraud can be automatically uncovered at acceptable False Positive rates.
These methods make use of data only recently available to Tax offices, and of data exchanged through Eurofisc. Therefore, with 80 per cent of the data used being collected from international systems, this means that all Member States have access to this same data and so the same detection algorithms can be quickly and easily applied.

**Social Network Analysis**

This is the most useful technique for VAT Carousel fraud, as it is specifically designed to discover the networks of organised crime. As data is ingested, the system automatically builds networks of relationships in the data (e.g. which directors have directorships at other companies; what transactions link different businesses together) where shared details are given such as addresses or telephone numbers (fuzzy matching methods link similar addresses together). It is the ability to apply all of the other hybrid model techniques to these networks in the data that allows the models to detect the truly complex VAT Carousel fraud.

**Automated Business Rules**

The most skilled investigators within the tax authority will have a range of techniques they employ to uncover VAT Carousel fraud. By having an environment in which these can be encoded as business rules that are then automated to run across the entire data set, it is possible to leverage these precious resources and their expertise.
Anomaly Detection

The system can be used to identify businesses that are not behaving in the same way as other businesses within their peer group. For example, this may relate to the types or volumes of transactions in comparison to the employee count. Such anomalies are risk factors and useful ways of discovering new types of fraud modus operandi.

Predictive Modeling

When a number of businesses known to be associated with VAT Carousel fraud are identified, these can be used to train models that look at combinations of variables or business rules and then optimise them to best predict that a particular business or network of activity is associated with fraud.

Text Mining

Descriptions of transactions may hold clues to the fact that businesses may be involved in fraud, e.g. the particular categories of goods that a business is importing or exporting. Text mining is a technique that allows that information to also be included in detection models.

The Benefits

Detect more fraudulent activity:

- Increase ROI per investigator, by prioritising higher-value cases and conducting more efficient and accurate investigations.
- Greatly reduce ratio of false positives, enabling up to 80 per cent hit rate (8 out of every 10 alerted cases result in fraud being found).

Faster detection = decreased fraud losses:

- Detect VAT Carousels before they happen.
- Discourage fraudsters from trying to commit fraud in the first place.

Increase efficiency:

- Reduce time needed for pre-investigation and data preparation (from 3 weeks to 5 minutes).
- Improve investigation efficiency with advanced case management tools (+100 per cent efficiency improvement during investigation).
- Capture the disposition of fraud investigations to fine-tune the detection analytics over time and build a database of known risk factors.
A consolidated view of fraud risk:

The SAS Fraud Framework for Government gives you a consolidated view of fraud risk, enabling you to:

- Improve models on an ongoing basis and continuously adapt the system to address changes in fraud trends.
- Better understand new threats and prevent substantial losses early.

Belgian Federal Public Service (FPS) Finance

Analysing VAT returns, verifying import and export customs declarations, consolidating and checking the data from dozens of local tax collectors’ offices - these are just a few of the jobs that the Belgian Federal Public Service (FPS) Finance has entrusted to SAS software for reasons of speed, efficiency and flawless execution.

The FPS Finance is a government institution that collects huge amounts of data from a variety of sources, including the Collection and Recovery Department of the FPS Finance, which collects money from taxpayers and checks on late payers. It also recovers funds due from non-paying individuals and companies, using all possible legal means if necessary. Every year the department handles information related to over three million income tax returns, which results in one of the largest databases in Belgium. The department also manages the analysis of real estate for patrimonial documentation, the analysis of all tax returns from legal bodies as well as private citizens and VAT, and the risk evaluation of import and export customs declarations for merchandise.

The co-ordinator of data mining at FPS Finance comments: "For the past few years, we have been keen users of SAS … mainly for risk management in the various fiscal domains. The reason is very simple: they are excellent solutions for data analysis and data mining, two crucial missions for our administration considering the size of all the fiscal data to be analysed, the fast-changing Belgian legislation and European directives. And the nice thing about it all is that the SAS tools fit perfectly with the IT standards of the FPS Finance."
Learn More

SAS is uniquely positioned to support EU tax authorities in their fight against VAT Carousel fraud. The SAS Fraud Framework provides an end to end framework for detecting, preventing and managing all types of VAT fraud and tax evasion. Only SAS combines all of the approaches outlined in this paper in a single integrated solution.

Furthermore, SAS is universally recognised as the worldwide leader of advanced analytics. Only SAS can provide governments with an open, high-performance and scalable solution for implementing analytics as part of an enterprise fraud detection strategy, while also supporting other critical analytical tasks.

To learn more, contact us at fraud.solutions@sas.com

End Notes

1  Commissioner Algirdas Šemeta
   Taxation, Customs, Statistics, Audit & Anti-Fraud

2  Commissioner Algirdas Šemeta
   Taxation, Customs, Statistics, Audit & Anti-Fraud
   European Serious & Organised Crime Conference 2013

3  European Council Conclusions Report – May 2013
About SAS

SAS is the leader in business analytics software and services, and the largest independent vendor in the business intelligence market. Through innovative solutions delivered within an integrated framework, SAS helps customers at more than 66,000 sites improve performance and deliver value by making better decisions faster. Since 1976 SAS has been giving customers around the world THE POWER TO KNOW®.