Business Intelligence Technology helps HMRC Increase Yield

Analytics to tackle fraud

HM Revenue & Customs (HMRC), the UK tax agency, has a powerful risking engine called Connect, which is at the heart of their work to tackle fraud and evasion. Whether pursuing organised criminal attacks or identifying common errors, HMRC uses analytics for risk profiling across over 22 billion lines of data to help select cases for investigation and target resources. HMRC and Capgemini worked together to implement and continually evolve Connect, to ensure that it remains a leading edge capability at the heart of HMRC's compliance strategy.

Data driven approach for profiling tax payers

HMRC implemented Connect to cross-match internal and third party data and uncover hidden relationships across organizations, customers and their associated data links, such as bank interest, lifestyle indicators and stated tax liability. It captures and transforms the data into a standard format for analytical and "spider diagram" visualization tools, which HMRC statisticians use to produce target profiles and risk and intelligence use to generate campaigns and cases for investigators. Automated feeds into HMRC's case management system allocate work to the correct caseworkers, and their feedback further refines intelligence in Connect.

People matter, results count.

Staff target fraud using information previously hidden in a mass of data

Compliance investigations and voluntary disclosures increase tax collection

HMRC uses Connect to enable an increasing number of successful investigations which have achieved over £4 billion of additional yield to-date. Connect lies behind the multi-disciplinary units to investigate high-risk sectors, and it enables targeted campaigns which incentivize mass voluntary disclosures. Streamlined risk and intelligence operations are delivered by 40% fewer staff. Skilled staff concentrate on tackling aggressive evasion rather than correcting errors, which historically took too much time, and which is now tackled in other ways.

For the first time HMRC can see all the information they have about a taxpayer at the touch of a button. Connect highlights patterns in HMRC's rich reserves of taxpayer and third party data to find anomalies and commonalities so they can focus skilled resources on businesses, individuals and sectors that pose the highest risk of error, fraud, and criminal activity. It produces in minutes what previously took months of research, or was simply not possible to do manually or on a volume basis. HMRC employees use these insights to build a profile for people and businesses who look like they are failing to pay the right tax.

Connect was first piloted in 2006 and implementation of the industrial-scale solution started in 2008, making HMRC one of the first organizations to use bulk data analytics and visualization technology to combat tax evasion in this way. Capgemini continues to work with HMRC to develop Connect's ability to match and interrogate bulk data and add new data sets.

Analytics drive a strong business case

HMRC's Connect pilot used analytics tools to assess a subset of tax data for a single geographic region and to cross-reference information from new external data sources. The pilot showed a good return on investment, so it was extended to more tax regimes, which helped HMRC uncover more fraud. Staff found up to a fifth more Self Assessment cases for investigation compared to existing risk profiling techniques, and they used it to help prevent £330 million fraudulent VAT repayments. This established a strong business case to build a business intelligence solution to help transform the way HMRC staff detect and stop fraud and error.

Business and IT co-locate to deliver change

The program to industrialize Connect included HMRC's IT and compliance community, Capgemini for program management, system and service integration, and our Ecosystem partners:

- BAE Systems Applied Intelligence for the analytics toolset and consultants who helped build data networks and business-led training
- SAS for data analysis and data mining products and tools

From the start of industrialization it was clear that staff needed to work with Connect to understand its huge potential, and to help address this business and multi-IT partner teams co-located to deliver the change.

Previously identifying potential fraud was largely manual and involved analyzing spreadsheets of data from individual tax regime systems. Analysts often perceived that IT tools would be too crude to give useful insights, so their role applying their own intelligence and experience to refine Connect was vital to creating an effective, easy to use solution. Investigators and caseworkers reviewed the visualization tools to agree how the spider diagram of economic activity they uncover is displayed to help them focus on the right questions to start enquiries.

Phased implementation

The technical delivery of Connect was phased to deliver the biggest returns to the largest number of users first.

- Phase 1 – Integrated Compliance Environment (ICE) graphical analytical tool and infrastructure to provide risk and intelligence analysts and tax investigators with technology to follow threads of information and highlight anomalies in stated tax liability. Spider diagram functionality provides visual representation of the customer and their associated data links such as addresses and telephone numbers, bank interest, income and lifestyle. Users can quickly identify potential compliance and fraud risks and present complex relationships in a simple format, ready for further investigation.

- Phase 2.1 – Analytical Compliance Environment (ACE) risk profile tools - provided technical analysts and statisticians the tools to interrogate and risk profile large volumes of data. They create profiles based on key risks identified within the data and are used regularly to produce a target population for investigation. These profiles are maintained and adapted to reflect changes in customer behaviour.

- Phase 2.2 – Interface between ACE and HMRC's strategic case management system - delivered automated feeds from ACE into the case management system which assigns, manages and monitors work for 15,000 caseworkers. It centralizes case-related information and allocates work to the correct staff so HMRC has a single view of the status of work across teams. Caseworkers input their feedback into Connect to further refine intelligence.

- Phase 3 – Data Acquisition and Networking (DAN) – was the largest, most technically challenging project within the industrialization program. It captures millions of data items in different formats and transforms them into a structure that the corporate data warehouse passes to the analytical and visualizer applications, via the DAN environment. Data feeds include VAT related transactional data which is refreshed daily, annual Self Assessment returns, and information from third party suppliers via EDI, the internet and CDs. All data used is proportionate and appropriate in tackling the range of risks and issues that HMRC faces, and Connect has strong controls on movement of data.

The IT solution supported major business change. A new structure was created in the Risk & Intelligence directorate which blends operational research, data specialists and frontline expertise, and a Connect Academy was set up to deep-skilled analysts over one year.

Identifying suspected fraud or error with Connect

Connect lies behind the creation of regional profiling centres and multi-disciplinary units, which investigate high-risk sectors, such as scrap metal merchants, and which target specific groups, ranging from gang-masters to high-income individuals. When the industrialized Connect solution was introduced, around 150 analysts worked with operational teams to identify specific populations with potential risks. HMRC continually invests in their Customer Compliance organization and technology which has generated a 37.1 to 1 return on investment. By 2016 there were over 4,000 users and this number will increase to 5,000. Analysts and compliance investigators work together to profile cases, review results, modify them in real time and launch investigations to confirm or reject the suspected fraud or error. Capgemini staff support this team, providing light-touch change control to update risk rules in Connect.

The collaborative approach:

HMRC and Capgemini worked together to implement Connect, and Capgemini has continued to play a key role, enhancing Connect to help HMRC counter emerging threats. Developments include increasing the number of data sets, introducing new risking tools, and mining unstructured data to enable ever-more sophisticated identification of hidden-economy transactions and understated sales. Future developments include linking Connect to HMRC's Enterprise Data Hub which is a single space to store and analyze customer data.

About Capgemini

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Approved by

Billie Major,
Corporate Vice President,
Capgemini

HM Revenue & Customs (HMRC), the UK tax authority, is responsible for making sure that the money is available to fund the UK's public services and for helping families and individuals with targeted financial support.

For more information, please visit:
www.gov.uk/hmrc

For more information on this project, please contact:
success.story.in@capgemini.com