Governments Improve Retail VAT Collection by Utilizing the Internet of Things

Intel simplifies fiscal compliance with new, cloud-connected, end-to-end solution that scales across countries—and devices

The European Union estimates 177 billion euros in lost value-added tax revenue in 2012 alone.¹

Fighting the Shadow Economy

The financial crisis gave governments worldwide a powerful incentive to tackle the “shadow economy.” This parallel market includes all unreported and hidden economic activity, which costs nations vast amounts in lost tax revenue.

Point of sale (POS) and transactional devices pose an especially high risk for tax noncompliance and efficient tax collection. While digital technology has accelerated the evolution of payment transaction processing, it has also aided those who would commit fraud.

A next-generation, end-to-end, cloud-based fiscal compliance solution based on Intel® technology equips you with the ability to securely enhance the collection of value-added sales tax (VAT) for retail transactions.

Figure 1. Unreported and hidden economic activity costs nations billions in lost tax revenue.

Note: When available, an estimate of the year the country instituted fiscal compliance legislation has been included.
The Cost of Lost VAT
The underreporting of taxable sales and income is a global challenge, adding up to big tax losses annually for countries around the world.

What is lost annually?
- **United States**: Several hundreds of billions of dollars
- **Russia**: 15 percent of the country’s entire economic output
- **Europe**: 2.1 trillion euros, representing 18.5 percent of total economic activity
- **Quebec**: $425 million for the restaurant sector alone

There are six basic steps that occur in a sales transaction when a customer makes a cash purchase from a business using an electronic cash register (ECR). If a “zapper” is inserted in the ECR, or in the POS system, the user can eliminate some or all traces of cash sales without leaving a digital record (assuming the absence of an anti-fraud device). Phantom-ware applications do the same thing, except their programming is embedded in the ECR’s operating system.

In response to the growing threat of the shadow economy, governments are introducing new VAT legislation or strengthening existing legislation with fiscal regulations that directly affect retail transactional devices. The legislation commonly demands the following:
- Secure and auditable ways to manage sales tax collection in retail devices
- More efficient methods of tax collection
- Faster access to tax revenue data

The response also includes regulations mandating the use of certified transactional devices with fiscal compliance technology. This combination of legislation and regulations offers the best tool for preventing sales tax fraud, tax evasion, and digital fraud using electronic sales suppression techniques.

Sweden and Intel Leading the Way
In 2010, Sweden introduced the Swedish Cash Register Act, which required businesses to use certified cash registers with a fiscal compliance solution (the off-line control box) for the collection of VAT. In the act’s first three years, Sweden recouped 1 billion euros in tax revenue, while also helping establish fair competition in the retail marketplace. This proved the case for implementing effective fiscal controls.

Intel then sought to advance these solutions to enable a more effective, secure, and cloud-based approach to VAT collection. To help make its case, Intel worked with an independent Swedish certification body to demonstrate that the Intel® fiscal architecture could support Swedish fiscal regulations. Using Intel building blocks, enhanced with fiscal applications, Intel pursued a new cloud-based technology platform that improves how VAT is collected.

As many of the Swedish requirements are similar to those found in other countries, the Swedish application can provide a base platform for a new generation of fiscal cloud-based solutions. This enables Intel to now offer other nations a pretested, largely prebuilt solution based on the most common fiscal components. This significant head start promises to save governments and OEMs considerable time and cost.
Countries like Sweden are illustrating how revenue bodies can put in place systems to strengthen their VAT-collection capabilities, enhancing the reach of audit activities by strengthening the control chain. A growing list of other countries has enacted or is pursuing similar legislation, including Turkey, Malaysia, and Brazil.

The convergence of lost revenue and growing legislation is accelerating the worldwide market for smart fiscal control devices for retail. A new generation of cloud-based fiscal compliance solutions is poised to enable tax authorities to improve the effectiveness of sales tax collection from retail transactions.

**Intel® Technology for Fiscal Compliance**

A next-generation, end-to-end, cloud-based fiscal compliance solution based on Intel® technology equips governments to securely enhance the recording, collection, and management of VAT for retail transactions.

The underlying Intel®-based platform provides the stronger encryption, security, connectivity, and cloud storage capabilities mandated by the new fiscal requirements. The solution is based on an “off-the-shelf” solution architecture from Intel (e.g., Intel® Quark™, Intel® Atom™, or Intel® Core™ processors) combined with Wind River and McAfee software solutions. The Wind River Intelligent Device Platform (IDP) is based on Wind River Linux*, and offers baseline ingredients for next-generation, cloud-based VAT collection systems.

**Hardware, software, and data security features**

The open hardware and software fiscal platform helps reduce the risk of tampering in each jurisdiction. The solution provides for an end-to-end encryption of receipt information from the moment a transaction is initiated through to the storage of the encrypted receipt information on a government cloud server.

The Intel® IoT Gateway on which the solution is based is secured in three ways. It starts at the silicon with opportunities to lock down the hardware with available features such as Discrete TPM and Secure Boot. The OS and applications are also protected through whitelisting and Grsecurity*, a security enhancement to the Linux kernel. Finally, data is safeguarded, both at rest and while in flight, based on features including OpenSSL*, a software library for applications needing secure communications; and iptables*, the default firewall on all official Ubuntu distributions.

An Intel®-based fiscal compliance platform offers one of the most complete security feature sets in the industry.

**Fiscal manager**

The fiscal software module, or fiscal manager, represents the true value of the Intel solution: It puts into practice fiscal legislation for the secure recording and storage of retail VAT. It has been fully implemented to meet nations’ fiscal requirements, and includes the following:

- **Signing module** — Helps secure cryptography of signing data (e.g., transactional receipts)
- **Buffering module** — Implements communication logic and state machine, providing temporary buffering and permanent storage of data (e.g., receipts or log files)
- **Platform** — Uses Intel® Quark™ processor running Wind River Intelligent Device Platform XT 2.0*

**Scalable across devices**

An Intel®-based technology platform provides for a new generation of scalable solutions across a range of devices, including fiscal control boxes (“black boxes” that plug into cash registers), fiscal printers (receipt printers), integrated fiscal POS devices/ECRs, and fiscal retail tablets.
New revenue opportunities
The Intel®-based end-to-end platform can lead to the upgrading of old services for OEMs and retailers. It can also drive new revenue models, such as services and API development of apps, creating additional recurring revenue.

Security, manageability, and connectivity features
The fiscal software stack has security rooted in the hardware components; integrates security, connectivity, and manageability; and provides the necessary connectivity capabilities. Not only is the licensing taken care of for all the components, but the Intel IoT Gateway platform also comes with source code. The entire stack is preintegrated and prevalidated in an open environment, providing all the building blocks to develop applications and services, as well as host third-party applications and services.

Broad applications
An Intel®-based fiscal solution facilitates tax compliance for businesses in a range of sectors, including retail, hospitality, taxis, vending machines, kiosks, and others. It addition, it scales to new applications, such as gas-pump monitoring and retailer rent models based on a percentage of sales, as well as transportation and traffic control.

The solution also lowers barriers to entry for the introduction and implementation of new regulations. It does so by helping the ECR/POS industry to adjust its products to technical requirements and end users/taxpayers to achieve tax compliance.

Get Started Today
Talk to your Intel representative today to arrange for a demonstration of the Intel-based fiscal compliance platform.

DRIVING VALUE FOR GOVERNMENTS—AND CITIZENS
Deploying a secure, effective fiscal compliance solution promises a host of advantages for governments looking to combat the shadow economy and maximize national tax revenues. In terms of economic value, governments can better predict and prepare, helping them to drive year-over-year growth. They can also broaden tax collection and take more timely corrective actions when necessary.

Political benefits can be expected as well. A secure, managed, cloud-based fiscal compliance solution can help reduce tax evasion, thereby supporting a fairer distribution of public resources, which stands to benefit government programs and citizens alike. A fairer competitive market is another possible dividend.

By decreasing bureaucratic obstacles, such a solution is also well positioned to deliver operational value to governments. Fiscal transaction devices can be more easily remotely provisioned and audited. Tax rates can be changed in real time. Simply put, a tailor-made, tamper-proof solution gives governments a more effective way to record and collect VAT.


Intel technologies’ features and benefits depend on system configuration and may require enabled hardware, software, or service activation. Performance varies depending on system configuration. No computer system can be absolutely secure. Check with your system manufacturer or retailer or learn more at intel.com.

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