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Title: The need for global standards and solutions to combat counterfeiting

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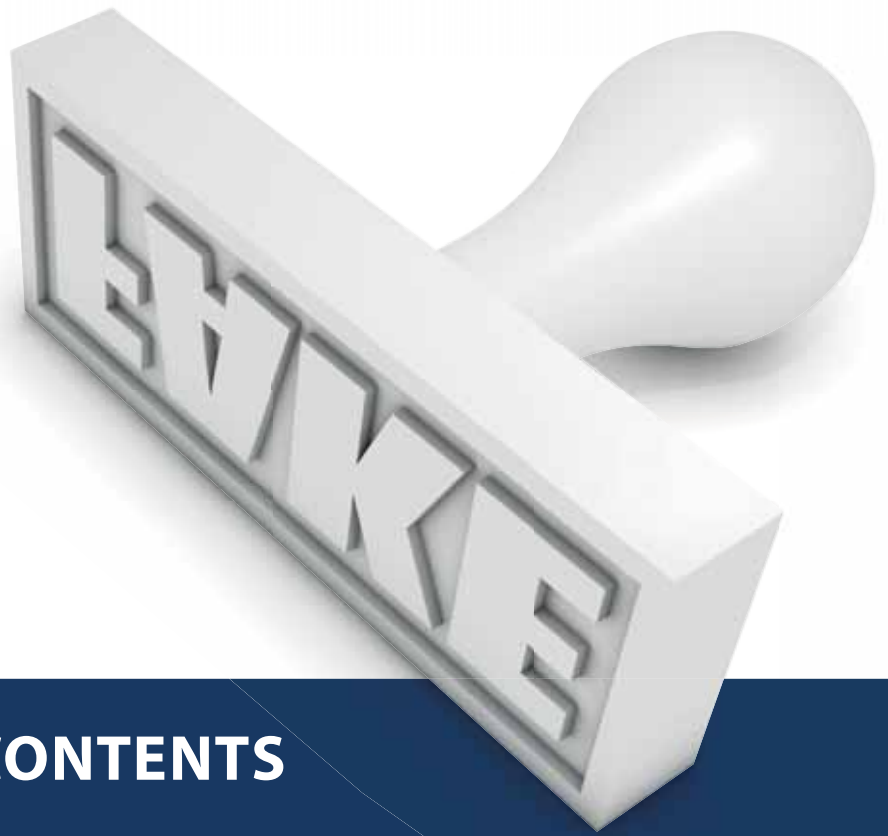# THE NEED FOR GLOBAL STANDARDS AND SOLUTIONS TO COMBAT COUNTERFEITING

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1 OVERVIEW

The purpose of this whitepaper is to provide insights into the increasing threats posed by counterfeit and illicit trade and to outline how GS1's global standards, services and solutions can play a vital role in counteracting the problem.

The whitepaper highlights key emerging trends and deceptive practices and outlines how to secure global supply chains against the threats of counterfeit goods through greater visibility, traceability and transparency.

It will further explain how existing GS1 Standards can assist in reducing the threats, helping to answer the following questions:

- What is the business value that will result from including GS1 standards, services and solutions in my brand protection strategies?

- What standards, services and solutions are available today?

This whitepaper will help readers understand the answers to these questions by:

- Describing the standards, processes and technologies that can uniquely identify objects and supply chain activities to provide greater visibility and traceability throughout organisations and their extended supply chains;

- Describing how standards-based approaches enable more productive, mutually beneficial relationships among trading partners by enabling more rapid detection and recall of unsafe or counterfeit products;

- Describing an interoperable framework for object identification and authentication services.

2 EXECUTIVE SUMMARY

The counterfeit problem

International cooperation and a sustained and focused approach is needed to tackle the rapidly growing counterfeit trade which is estimated to reach USD $1.77 trillion by 2015[1]. While the extent and reach of the problem is well understood, reducing the risks and impact will require a global collaborative effort between industry and governments as well as the effective deployment of global supply chain standards.

Counterfeiting jeopardises public safety, undermines legitimate businesses and harms national interests:

- In November 2012, the South Korean government shut down 2 nuclear reactors[2] after discovering more than 7,600 parts from 8 suppliers had forged quality certificates. The two reactors account for about 5% of South Korea's national power supply. Their suspension will significantly reduce the amount of energy supply that South Korea holds in reserve each day during peak winter months in January and February.

- The World Health Organization views the counterfeit of medical products as a tremendous risk to public health.[3]

- G20 member countries have an estimated 3,000 deaths annually due to counterfeit consumer goods.[1]

- Legitimate businesses must compete with counterfeiters while brand owners and Intellectual Property Rights (IPR) holders face significant business and financial risks.[1]

- G20 member countries lose USD $77.5 billion in tax revenues while incurring an additional USD $25 billion increased cost of crime. An estimated 2.5 million jobs have been lost, increasing the annual cost of welfare.[1]

1 Estimating the global economic and social impacts of counterfeiting and piracy. Business Alliance to Stop Counterfeit and Piracy, February 2011
2 http://www.cnn.com/2012/11/05/world/asia/south-korea-nuclear-reactors/index.html

3 http://www.policynetwork.net/health/media/fake-drugs-kill-over-700000-people-every-year-new-report

To a great extent the public view of counterfeit products is one of ambiguity, it is often seen as a victimless crime, which of course is far from the truth. This lack of appreciation of the threat of counterfeits actually encourages and supports its continued growth. The three major threats from counterfeits are:

1. Consumer safety is jeopardized through counterfeit food, medicines, medical devices, toys, consumer electronics, alcohol, tobacco, automotive parts etc.

2. Economic threat impacts business and governments – reducing the market for legitimate business and reducing revenue for governments – vat, duties and other taxes while increased cost for enforcement.

3. National Security is put at risk with counterfeit electronic components in military and defence equipment poses a national security risk.[4]

Counterfeit products are penetrating into legitimate and highly secure supply chains.

The increased globalisation of trade coupled with the fact that in many countries the penalties for trading counterfeit goods are low or non-existent has encouraged the growth of global counterfeit activities, in many cases operated by criminal gangs and terrorists groups.

For these reasons global solutions are needed to address the ever-growing threats presented by this flourishing criminal activity. In essence, current supply chains are not fit for purpose in terms of their ability to protect and detect counterfeit penetration into legitimate and secure supply chains.

4   http://www.aia-aerospace.org/assets/counterfeit-web11.pdf

The Solution

GS1 is ideally positioned to play a key role in the development and deployment of Global standards, services and solutions to combat counterfeiting. Solutions to counteract the growing counterfeit problem need to be global in nature. This is where GS1 comes in and provides real and immediate answers to this growing problem.

GS1 is the only global not-for-profit organisation assigned the trusted role of Issuing Agency for unique object Identifiers. This vital role is authorized by the International Standards Organization (ISO) who has allocated a block of Issuing Agency Codes (IAC's) to GS1 ranging from 0 to 9. In accordance to ISO standards, no other organisation shall be allocated this block of unique identifiers. GS1's role as an Issuing Agency is to ensure allocation rules are defined, identifiers are registered, controlled and maintained to ensure global uniqueness.

As an Issuing Agency, GS1 assigns Unique Identification keys that supports various industries with globally unique identification of objects including physical goods, logistics units such as pallets and containers, returnable assets, physical locations, services etc. Upon registration with GS1, a company is assigned a globally unique Company Prefix (GCP), which allows them to create any of the GS1 identification keys in support of their business and supply chain operations.

Key Concepts

    GTIN   - Global Trade Item Number
    GLN   - Global Location Number
    SSCC   - Serial Shipping Container Code
    GRAI   - Global Returnable Asset Identifier
    GIAI   - Global Individual Asset Identifier
    GSRN - Global Service Relation Number
    GDTI   - Global Document Type Identifier
    GSIN   - Global Shipment Identification Number
    GINC   - Global Identification Number for Consignment
    GCN   - Global Coupon Number

Essentially the global solution to the counterfeit problem starts with a foundational layer of globally accepted supply chain standards acting as building blocks to *identify objects* and then to *capture the information* about them at key points in the supply chain and then to *share the information* seamlessly among stakeholders.

The GS1 Visibility Framework[5] pulls all of this together and provides the much-needed foundational layers and building blocks that allows organisations to focus more on how to use the information rather than how to get the information. It helps to improve collaboration, traceability, transparency, security, and visibility in the supply chain. A key component of the Visibility Framework enabling real-time sharing of supply chain event information is the application interface standard called Electronic Product Code Information Services[6] (EPCIS), which is both industry and technology neutral. Real-time event management can play a vital part in helping to secure supply chains and reduce the risk of counterfeit penetration while goods are in transit.

Immediate benefits can accrue from the usage of existing global standards, services and solutions. They can be used by brand owners to provide customs and other market surveillance authorities with access to information which could help them to accurately identify objects and then route their verification query to the authoritative source for further authentication purposes.

5   http://www.gs1.org/visibility
6   http://www.gs1.org/gsmp/kc/epcglobal/epcis

3   THE COUNTERFEIT PROBLEM

Counterfeiting has changed from being largely localised operations into highly profitable global businesses with mass production, global sales, and complex global distribution networks. Counterfeit physical objects can be found in almost every country and in virtually all sectors of the global economy.

Counterfeits are often substandard and can pose serious health and safety risks, with an estimated 3,000 deaths annually in the G20 member economies. In 2011, the Paris-based Business Alliance to Stop Counterfeit and Piracy (BASCAP) estimated that the counterfeit and piracy market is growing annually at 22%.

According to BASCAP counterfeiting and piracy impact virtually every product category. The days when only luxury goods were counterfeited, or when unauthorized music CDs and movie DVDs were sold only on street corners are long past. Today, counterfeiters are producing fake foods, beverages, pharmaceuticals, medical devices, electronics, semi-conductors, electrical goods and supplies, auto and airplane parts as well as everyday household products.

Millions of fake products are being produced and shipped around the world to developing and developed markets alike at increasing rates, penetrating legitimate and secure supply chains. Consumers and patients are at risk from

Table 1. The Complete Picture

Estimate of the total value of counterfeit and pirated products in 2008 and 2015, and impacts on the broader economy and employment.
Source: Frontier Economics

OECD Category	OECD Estimate in $ billions (2008)	BASCAP Estimate in $ billions (2015)
Internationally traded counterfeit and pirated products	$285 - $360	$770 - $960
Domestically produced and consumed counterfeit and pirated products	$140 - $215	$370 - $570
Digitally pirated products	$30 - $75	$80 - $240
Sub total	**$455 - $650**	**$1,220 - $1,770**
Broader economy wide effects *	$125	*$125 +*
Employment losses**	2.5 million	*2.5 million +*

* Effects on government tax revenues, welfare spending, costs of crime health services, FDI flows

** Estimate limited to G20 economies

unsafe and ineffective products, while governments, businesses and society are being robbed of billions in tax revenues, income and jobs.

The drain on the global economy is significant and the longer-term implications of the continuing growth in this illicit trade are enormous. In 2008 the OECD has reported that "international trade in counterfeit and pirated products could be up to US$ 360 billion". Taken together with the value of domestically produced and consumed counterfeits, the significant volume of digital and fake products being distributed via the Internet, and the loss of economic development, harm to health and safety, reduced technology transfer, and innovation, the total magnitude of counterfeiting and piracy worldwide is estimated to be
well over US$650 billion. The BASCAP report has used the OECD 2008 analysis and estimated the 2015 impact of USD 1.77 trillion.

A disorder of this magnitude undermines economic development, a sound market economy system and open international trade and investment. No legitimate business and no country is immune[7] to the impact of counterfeit and piracy. No single business, business sector or country can fight this battle alone.

In order to ground this discussion we have chosen to look briefly at a sector which more than any other has been sucessfully targeted by counterfeiters with dangerous consequence for patients and serious impact on the legitimate manufacturers of branded and generic medicines.

7   http://www.chamber.ca/images/uploads/Reports/2012/120607CIPC_
    Counterfeiting.pdf

The link between pharmaceutical counterfeiting, crime and national security

The World Health Organisation (WHO) views the counterfeiting of medical products as a tremendous risk to public health. Pharmaceuticals purchased over the Internet are from sites that conceal their physical address are counterfeit in over 50% of cases[8]. While the risk of counterfeit medicines is low in developed countries, it remains a major global issue costing the pharmaceutical industry billion of dollars and the innocent people who take them their health or lives[9].

The deadly implications of counterfeit drugs are well understood to be a central challenge to the integrity of public health systems around the globe, as well as a direct threat to our individual health and welfare. What is less understood is that the profits from this sinister crime are increasingly being co-opted by an array of organized criminal groups[10] and terrorist entities as a means by which to fund their operations around the world. As such, counterfeit pharmaceuticals pose a direct threat to national and international security.

Combating the sale of illegal medicines online

Operation Pangea[11] is an international week of action tackling the online sale of counterfeit and illicit medicines and highlighting the dangers of buying medicines online. Coordinated by INTERPOL, the annual operation brings together customs, health regulators, national police and the private sector from countries around the world.

Activities target the three principal components used by illegal websites to conduct their trade – the Internet Service Provider (ISP), payment systems and the delivery service.

The operation has gained significant momentum since its launch in 2008. The first phase of the operation brought together 10 countries, with the number rising to 100 in 2012.

Results from Pangea V from September 25th to October 2nd 2012:

- 3.75 million illicit and counterfeit pills confiscated;

- Estimated value: USD 10.5 million;

- More than 18,000 websites shut down;

8   http://www.who.int/bulletin/volumes/88/4/10-020410/en/index.html
9   http://www.worldfinance.com/home/special-reports-home/
     trade-in-illegal-medicine-hits-pharmaceutical-sector
10   http://www.interpol.int/Crime-areas/Pharmaceutical-crime/
     Pharmaceutical-crime
11   http://www.interpol.int/Crime-areas/Pharmaceutical-crime/Operations/
     Operation-Pangea

Trends in Counterfeiting and Deceptive Practices

Counterfeiters will use every means possible to deceive authorities and their customers. The following are known trends and deceptive practices.[12]

Trends and Deceptive practices

- Unbranded physical objects are shipped separately from their labels, insignia and brand packaging.

- Counterfeiters specialising in producing either counterfeit labels, insignia or consumer packaging export these products to assemblers who complete the final assembly of the counterfeit objects.

- Counterfeit components or sub-assemblies are shipped separately to Free Trade Zones (FTZ) to be assembled and distributed within the FTZ or to countries outside the FTZ.

- FTZs are used to mask the origin of counterfeits

- Part of a genuine shipment or container/pallet of goods are replaced with counterfeits (i.e. genuine and counterfeit co-mingled).

- Sales on the Internet of counterfeit goods indicated as excess, over-stock or returns.

- Consumer-to-consumer (C2C) sales of counterfeit products take place both online and offline.

- Differences and gaps in local laws, regulations and enforcement ability are taken advantage of to keep as many stages of counterfeit activities from being shut down for as long as possible, exposing lower-level traffickers to legal ramifications.

- Increasing use of the Internet as a sales channel.

- Increasing use of legitimate courier and regular post for small packages, making it more difficult for enforcement to curtail such activity.[13]

- 133,000 packages inspected by regulators and customs authorities, of which around 6,700 were confiscated;

- 80 individuals are currently under investigation or under arrest for a range of offences, including operating a clandestine laboratory producing counterfeit medicines; membership of a criminal group selling illicit medicine online; and operating websites selling illicit medicines.

The usage of GS1 Standards, Services and Solutions could assist in building the very basic level of trust between buyers and sellers online. Trust can be added with verifiable source information about the seller, the products and methods to authenticate the products once received by the buyer.

> **Continued growth in the online sales of pirated and counterfeit hard goods will soon surpass the volume of such goods sold by street vendors and in other physical markets. [13]**

12 http://www.ustr.gov/about-us/press-office
reports-and-publications/2012-2
13 http://www.chamber.ca/images/uploads/Reports/2012/120607CIPC_
Counterfeiting.pdf

4 THE SUPPLY CHAIN CHALLENGE

Current Supply Chain Overview

The existing supply chain in many sectors is not fit for purpose in terms of its ability to cope with the challenge of the growing counterfeit problem. The shortcomings are due to the fact that current supply chain processes are based on legacy systems, which in the past were heavily dependent on paperflows. Although there has been adoption of AIDC (ie. the barcode or RFID tag) and EDI technologies, the solutions deployed, with some notable exceptions, have not included global standards for unique object identification, traceability and event management as core components and therefore visibility across the extended supply chain is often low.

The evidence to support this is the poor recall capability of US and EU food manufacturing companies as reported by AMR Research in 2007.[14] The research found that 67% of Food Companies with USD$5 billion or more in sales had recalls that cost USD$20 million or more, that it took on average of 42 days to complete the recall process and that at best they could only locate 43% of affected

14   The AMR Research study, "Traceability in the Food and Beverage Supply Chain," conducted by Research Directors Lora Cecere and Lucie Draper, and Senior Research Analyst Simon Jacobson

products in the most serious category of recall. Counterfeit products can be the cause of a serious recall - given this reality it spells out the need for greater transparency and visibility of supply chains in order to enable effective object identification and authentication processes to counteract the increasing threat from counterfeiters.

GS1 and industry worked on solving this problem and a new global messaging standard for product recall was ratified in June 2012.[15] The accompanying online recall notification service operated by GS1 organizations on behalf of industry in USA[16], Canada[17], Australia[18], New Zealand[19] and South Africa[20] reduces the critical time to communicate the recall or safety alert to all supply chain stakeholders including government to less than 1 hour. The standard and the services taken together, reduce risks to business and to consumer safety.

Proprietary solutions are not the answer

In recent years numerous proprietary solutions for object identification, authentication and secure supply chains have been developed mainly in isolation from each other. They lack the critical interoperability required to ensure that all supply chain partners can readily deploy them.

In particular, to be effective across the he multi-tier supply chain it is vital that all parties have a common globally unique object identification and data sharing standard which can be easily managed within their internal systems and with their trading partners.

While there is no single method to guarantee the identity and authenticity of physical objects across industries, unique object identification coupled with added security deterrents is a requirement in certain industry sectors. But these are components of a much wider brand protection strategy.

What is needed then to address the challenge?

The answer is enhanced supply chain visibility with improved traceability and transparency along the entire supply chain and, most importantly, solutions that are based on open, interoperable global standards which facilitate widespread and cost effective deployment.

Fortunately, GS1's global identification system includes globally unique identification for products, assets (objects) and locations as well as its standards for capturing and sharing visibility and traceability data between supply chain partners and other key stakeholders.

This foundational level of identification standards is ideally suited to supporting solutions which are needed to secure supply chains and provide effective means of identifying and authenticating an object in real-time in order to ensure that counterfeits are detected before they cause harm to consumer, businesses or national interests.

The GS1 Visibility Framework discussed in more detail in section 6, combined with other process standards, such as the GS1 Traceability Standard (GTS) and the business-messaging standard for Product Recall, become very powerful tools to enable safe and secure supply chains.

GS1 Barcode and GS1 object identifier or GTIN (Figure 1)

15 http://www.gs1.org/docs/media_centre/gs1_pr_139612_product_recall.pdf
16 http://www.rapidrecallexchange.org/About/tabid/56/Default.aspx
17 http://www.gs1ca.org/page.asp?LSM=0&intPageID=1395
18 http://www.gs1au.org/services/recallnet/
19 http://www.gs1nz.org/productrecallnz.php
20 Soft launch December 2012 with formal launch in June 2013.
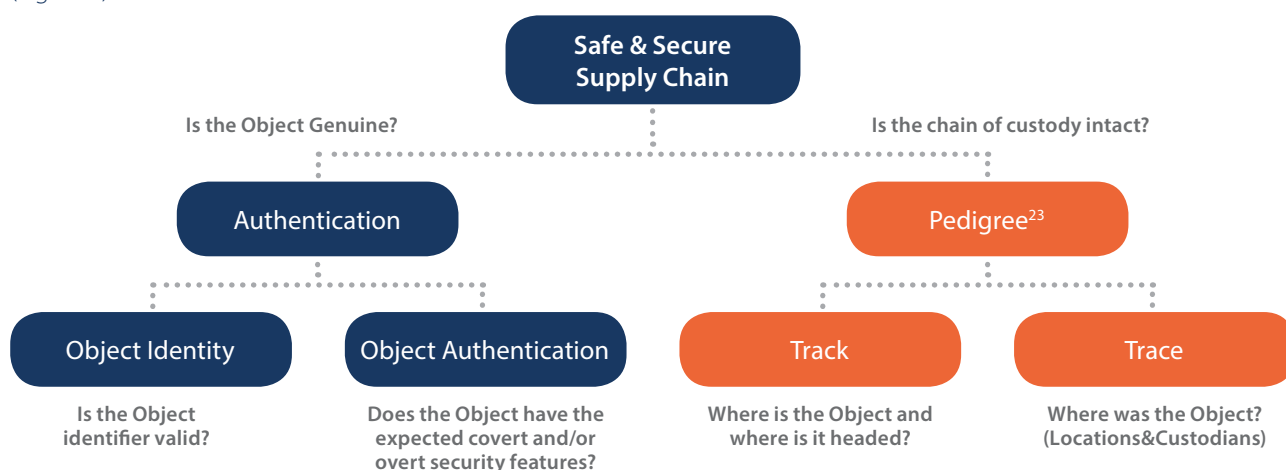
Safe & Secure Supply Chains

Developing and deploying safe and secure supply chains is critical not only to mitigate the risk of counterfeits, but to increase trust and transparency into trading partner relationships. The foundation layer for building safe and secure supply chains can be effectively addressed by deploying the GS1 Visibility Framework discussed later in this document and also available as a whitepaper.[21]

The GS1 Visibility Framework takes a comprehensive approach based on all key aspects highlighted in Figure 2 below and includes real-time event management and traceability.

This whitepaper focus briefly on aspects of Authentication, namely Object Identity and Object Authentication.

Safe and secure supply chain framework
(Figure 2)

- Safe & Secure Supply Chain
  - Is the Object Genuine?
    - Authentication
      - Object Identity — Is the Object identifier valid?
      - Object Authentication — Does the Object have the expected covert and/or overt security features?
  - Is the chain of custody intact?
    - Pedigree[23]
      - Track — Where is the Object and where is it headed?
      - Trace — Where was the Object? (Locations&Custodians)

Industry Use Case:

The EU Falsified Medicines Directive which seeks to have a more secure supply chain for the distribution of prescribed medicines requires serialisation of patient packs as well as tamper evident labelling to enable authentication of medicines prior to their being dispensed to patients. EFPIA (the European Federation of Pharmaceutical Industry Associations) has developed and successfully piloted an authentication solution based on GS1 automatic identification and data capture standards as well as the use of EPCIS for the operation of a federated database which ensures that a retail pharmacy can check the authenticity of a medicine before dispensing to a patient. In January 2012, GS1 global office and the EFPIA issued a joint vision statement for achieving the EU regulatory requirements.[22]

A practical example of real supply chain visibility, albeit on a small scale, is already working since 2005 and has demonstrated the ability to authenticate a product

prior to use and ensure a total recall of products across more than two hundred locations within 10 minutes. The NCHCD (National Centre for Hereditary Coagulation Disorders), which has responsibility for the safe treatment of haemophilia patients in Ireland has achieved 100% compliance with National and EU regulations. Furthermore the solution although originally implemented only for patient safety and compliance reasons has resulted in very significant financial savings including an annual ROI of more than 100%, a reduction in stock levels of €5m, and other benefits.

In October 2012, McKinsey published a comprehensive report highlighting the value of global standards in the healthcare supply chain. A copy of the report can be found at http://www.gs1.org/docs/healthcare/McKinsey_Healthcare_Report_Strength_in_Unity.pdf

The following section will explore Object Identity and Object Authentication briefly.

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21 http://www.gs1.org/docs/GS1_SupplyChainVisibility_WhitePaper.pdf
22 http://www.gs1.org/docs/healthcare/GS1-EFPIA_product_identification_vision_background.pdf

23 http://www.gs1.org/gsmp/kc/epcglobal/pedigree

Object Identity –
which object and what is it?

Object identity at the consumer and retail level:
At the retail level, the process to verify an objects identity such as a consumer product should start with the physical and visual inspection of the object itself. The integrity of the outer packaging and the presence of brand insignia, labels including a barcode with GTIN are vital clues to aid in the object verification process. A consumer should normally direct queries to the retailer before purchasing a product. With online purchasing and gifts, this process is not always possible and the consumer may need additional tools to verify the identify and authenticity of the product. A consumer should always try to contact the brand owner through a verified website or customer service phone number if any doubt exists about the object.

Many standalone websites and smart phone applications exist today that claim to provide information about products including product descriptions, features, nutritional information, pricing etc. etc. However, many of these sources may not be linked to the trusted product master data owner[24] by the product brand owner. Recent studies have highlighted that the accuracy of mobile scans for product information is very low. GS1 is working with industry to solve this problem with GS1 Source.

GS1 Source is a framework for sharing product information in consumer-facing digital channels. It is standards-based, scalable and interoperable. Companies can use GS1 Source to share information about their products in the cloud. Application developers can then integrate this product data in their web and mobile applications. In 2012, GS1 ratified it's Trusted Source of Data (TSD) 1.0 Standard.[25]

Object Identify for Customs and Market Surveillance:
If a customs officer or market surveillance agent has a consumer product, box of products, a pallet of goods or container with several pallets under review or inspection, the agent may need to find "identity" information about the products and shipment. This can be achieved by using GS1's Global Electronic Product Information Registry or GEPIR www.gepir.org

GEPIR is a unique, internet-based service that gives access to basic contact information for companies that are members of GS1. These member companies use GS1's globally unique numbering system to identify their products, physical locations, or shipments. By using the information on the product or its' packaging, and typing the numbers into GEPIR, anyone can find the

24 http://www.gs1.org/docs/gdsn/gdsn_brochure.pdf

25 http://www.gs1.org/source/about

legally registered owner of that barcode identifier and their contact information. Physical location numbers such as GLN's and Serialized Shipping Container Codes (SSCC's) can also be used as search criteria.

This is the first and arguably the most critical phase of object authentication.

Reasons why the object identifier would not appear on GEPIR includes:

- Incorrectly entered Object Identifier.

- Illegal usage of the Object Identifier – company using GS1 system but not registered.

- Object Identifier on a secondary label on the object or packaging and was assigned by the importer who is not registered with GS1.

- Counterfeit or fake Object Identifier – GEPIR may return a different company than that on the object. The brand owners website or customer service should be contacted ASAP if doubt exists about the identity of the physical object under review or inspection. Brand owners will generally have multiple brands within their portfolios.

- National security and privacy – manufacturers may be subject to national security or privacy guidelines and their product and/or company details may not be available online.

GS1's global standards also defined a *Global Product Classification Code*[26] or GPC. GPC is a structured; rules based classification system that gives buyers and sellers a common language for grouping products in the same way, everywhere in the world. The official (normative) GPC schema and GPC Browser information is published in Oxford English. Both the schema and the browser information are translated to other languages.

GPC is an invaluable tool for brand owners to categorize, register and share object master data with all trading parties. It can also be utilized by market surveillance to verify object identity and by customs for pre-import risk assessment. One government agency assessment of an objects GTIN plus it's GPC highlighted a potential 80% reduction in import holds while freeing up officers for more targeted inspections of high risk goods.

26   http://www.gs1.org/gdsn/gpc/what

Object Authentication – is it genuine?

Brand owners may provide various online, mobile, field or lab based applications and tools specifically for the purposes of authenticating a product. After verifying the object identity, the next step is to determine if the object is genuine.

Authentication of an object will depend on who is in the role of the object inspector and their knowledge of the product (object) and its authentication process and procedure. The inspector may have access to very limited or very detailed brand protection information, which may be simple or complex; depending on the objects value, complexity and intended usage.

Consumers: a consumer in the role of object inspector will generally rely on his or her own knowledge of a product (object) and a visual inspection to verify if it is genuine before a purchase. Consumers generally trust the retailer where they purchase the product to ensure that it is safe and authentic.

Customs or Market Surveillance Authorities: in these roles, customs or market surveillance may have access to limited or very detailed confidential information sources, typically a confidential portal which lists and describes the various brand protection strategies for a particular object. The brand protection strategies can have multiple verification tools that are required to verify the authenticity of an object:

Key questions for customs or market surveillance include: Does the physical object have the expected digital, covert and/or overt deterrents to prove authenticity? Who is the authoritative and trusted source to verify the object's authenticity?

Methods commonly used for Object Authentication (Figure 3)

Extrinsic Authentication Tools

Added for the *primary* purpose of authentication

Sensory tools
- Overt (obvious)
- Covert (hidden)
- Forensic (lab or field analysis)

Digital tools
- Object Serialization # (SGTIN)
- Object Identification # (GTIN)

Intrinsic Authentication Tools

Functional or aesthetic elements of the product *not primarily* intended for authentication

Could include:
- Specific materials
- Unique construction features
- Stitching

Hybrid Authentication

Combination of Digital & Sensory and/or Intrinsic & Extrinsic tools for enhanced brand protection purposes

Could include:
- (s)GTIN + Forensic feature
- (s)GTIN + Overt seal, label or hologram
- (s)GTIN + Intrinsic feature + Covert mark
- (s)GTIN + Covert feature

Building Interoperable Authentication Services

With the massive growth in counterfeiting across all industry sectors, there is an increase in the number of solution providers with proprietary solutions as well as in-house developed solutions by brand owners. The need for interoperability is well known and GS1 is participating in the ISO technical committee (PC247) and working towards a first draft in 2013.

Key to solving interoperability is a global standard and global infrastructure to enable it.

The recently ratified industry standard called Object Naming Service[27] (ONS) facilitates the need for interoperability of object identification and can enable interoperable authentication services.
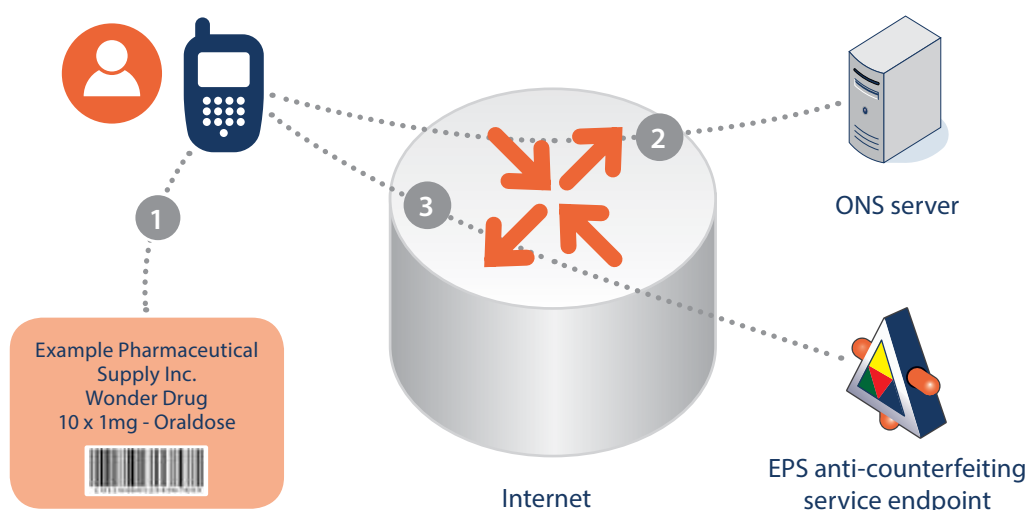
ONS offers a pragmatic and feasible strategy to address this growing need. Existing and new solution providers could openly compete and innovate with their services with ONS providing interoperability and routing to the authoritative source and service end point for the brand authentication information.

Brand owners or their solution providers retain full control of their authentication services including access rights and privileges, overall security, hosting, and user requirements. The service located by ONS could also be used to query blacklists, a record of cloned or compromised authentication codes, making it easier and faster to detect counterfeits.

Generally, ONS is about the successful discovery of relevant and trusted data and services associated with a GS1 Identification Key. At its simplest, a GS1 identification key such as a GTIN, SGTIN or EPC can be used to look up data and services configured by the company that assigned it. This can be a very powerful tool for all stakeholders in the supply chain, including the manufacturer, distributor, importer, customs, retailer, market surveillance, and even the consumer.

ONS Discovery Topology, GS1 ©
(Figure 4)

Example Pharmaceutical Supply Inc.
Wonder Drug
10 x 1mg - Oraldose

ONS server

EPS anti-counterfeiting service endpoint

Internet

27 http://www.gs1.org/gsmp/kc/epcglobal/ons

5 GS1 AND ITS ROLE IN SUPPORTING PRODUCT AUTHENTICATION AND TRACEABILITY SYSTEMS

The GS1 System is an integrated suite of standards, services and solutions that provide organisations of all sizes with a common language, enabling them to communicate and interoperate seamlessly as they do business. They are the most recognised, utilised and trusted supply chain standards in the world and include the ubiquitous barcode, which generate over six billion beeps at retail point-of-sale (POS) across the world on a daily basis.

GS1 Standards play a vital role in providing the critical links that build trust and transparency for business partners worldwide, from the raw material supplier through to the consumer.

By adopting GS1 Standards as the foundation for business processes and interoperability, companies of all sizes can speak a common language and leverage the power of information for the benefit of their businesses. Diverse industries are able to adopt them easily and can deploy GS1 Standards to transform the way they do business, following in the footsteps of industry leaders who have already developed industry best practices.

GS1's global standards for identification of products, locations, and the communication of data associated with each should form the basis for a company's anti-counterfeit protocols and brand protection strategies. Specifically, the GS1 System will enable globally unique object identification to be used in conjunction with multiple authentication systems and tools.

GS1's Global Traceability Standard[28] defines how industries should maintain complete traceability (Track and Trace) of all products from raw material to finished products and their movement along the supply chain.

6   THE GS1 VISIBILITY FRAMEWORK

The GS1 Visibility Framework allows organisations to focus more on how to use the information rather than how to get the information. It helps to improve collaboration, transparency, efficiency, security, and visibility in the supply chain. A key component of the Visibility Framework that enables real-time sharing of information is the application interface standard called Electronic Product Code Information Services (EPCIS), which is both industry and technology-neutral. It was created and designed by industry to fit within existing enterprise and security environments, supplementing existing enterprise information systems. It reduces complexities and the costs of systems integration while facilitating improved trading partner collaboration and visibility.

EPCIS enables supply chain partners to store and share physical event data including the what, when, where and why about physical observations (events), independent of the technology used to capture that information. This allows companies to associate and share additional information, or events, relating to an object's identity. For example, companies can associate information such as the time and date that a barcode was scanned or an RFID tag was read, the location of that scan/read, and whether the object was being shipped or received. Information that can also be related to the object includes temperature, associated purchase orders, and the business reasons for why the object moved. This additional information can be associated in an EPCIS database or repository. Having this granularity of information provides organisations with real-time visibility of objects inside an enterprise or across the supply chain between trading partners. This, in turn, enables companies to realise the full benefits of auto-identification, by making use of the information that has been captured.

GS1 Visibility Framework: Identify, Capture, Share
(Figure 5)

IDENTIFY: GS1 Standards for Identification

GLN Global Location Number   **GTIN** Global Trade Item Number   **SSCC** Serial Shipping Container Code   **GRAI** Global Returnable Asset Identifier   **GIAI** Global Individual Asset Identifier   **GSRN** Global Service Relation Number

MANUFACTURER   ITEM   CASE   PALLET   TRANSPORT   DISTRIBUTOR   TRANSPORT   PALLET   DISTRIBUTION CENTRE   TRANSPORT   CASE   ITEM   RETAILER HEALTHCARE PROVIDER OPERATOR   CONSUMER PATIENT CAREGIVER

CAPTURE: GS1 Standards for Barcodes & EPC/RFID

GS1 BARCODES   **GS1 EPC/RFID**

EAN/UPC   GS1-128   ITF-14   GS1 DataBar   GS1 DataMatrix   GS1 QR Code   GS1 Composite Barcode   EPC HF Gen2   EPC UHF Gen 2

SHARE: GS1 Standards for Data Exchange

MASTER DATA Global Data Synchronisation Network (GDSN)   **TRANSACTIONAL DATA** eCom (EDI)   **EVENT DATA** EPC Information Services (EPCIS)

← INTEROPERABILITY →

ITEM MASTER DATA   LOCATION DATA   ITEM / SHIPMENT TRACKING   TRACEABILITY   PRODUCT RECALL / WITHDRAWAL   PEDIGREE   PURCHASE ORDER / DESPATCH ADVICE / INVOICE

The following is an example of the GS1 Visibility Framework using EPCIS in action in Hong Kong. This brand protection service combines Identify + Capture + Share as well as ePedigree and Authentication services. It was deployed by GS1 Hong Kong in 2007 with industry and government support and funding. In this process model, serialized object identity codes are created (see EPC event 1). The serialized identifiers are then associated with the object master data, which describes the product and entered into GS1 Hong Kong PA Solution. EPC event 2 highlights where the 3rd party secure labelling company provides the secure label and authentication serial number to the manufacturer, who in turn applies the secure label to the object.

Below is the query response using the GS1 Hong Kong Consumer Connect mobile application.

GS1 Visibility framework in action
(Figure 6)
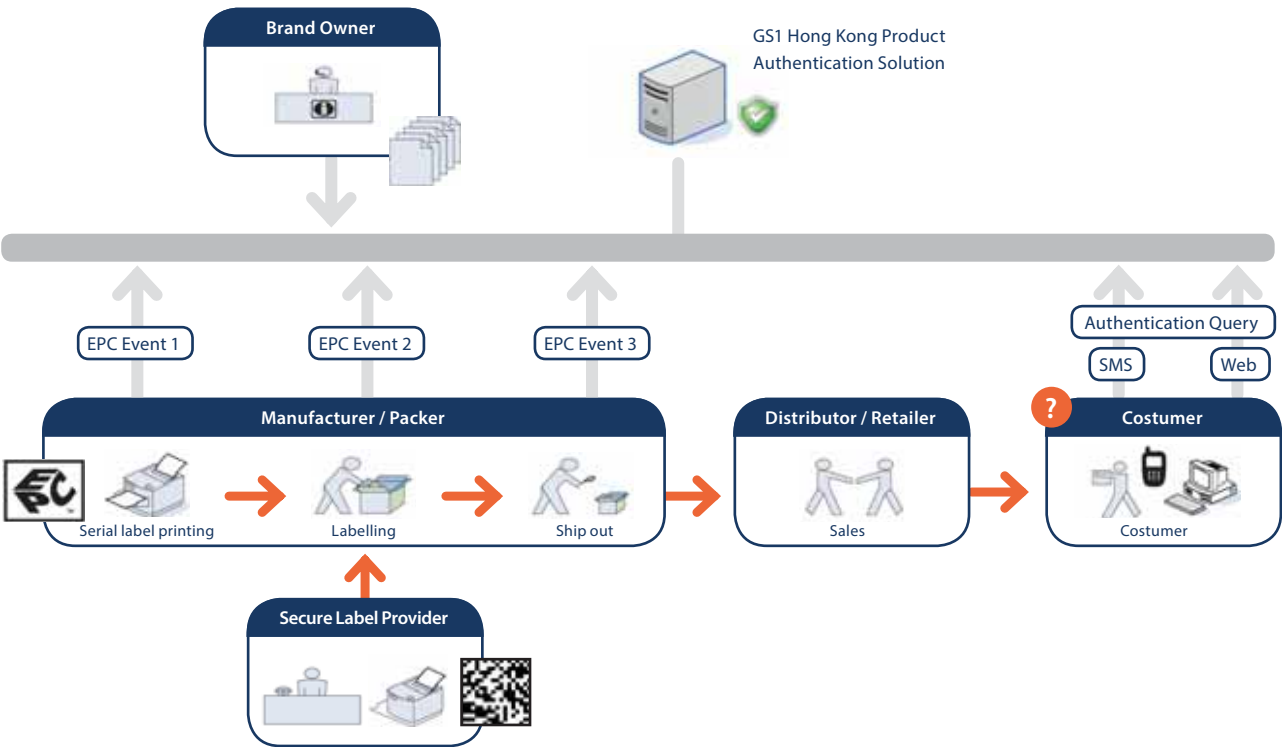
7 CONCLUSION

The increasing level of counterfeit activity in all sectors poses a huge challenge to industry and governments around the world. Counterfeiting is not a victimless crime but one which as we have seen can have dire consequences for citizens and industry alike.

One of the key underlying causes of the successful growth of counterfeiting is the inability of current supply chain systems to effectively counteract this criminal activity. The answer lies in greater visibility, traceability and transparency across supply chains from raw material to point of sale/use. Fortunately GS1 and its interoperable standards services and solutions are capable of supporting industry and government agencies to put effective solutions in place to tackle the problem.

The time to act is now. Deployment of GS1 Standards, Services and Solutions as a foundational layer and building blocks is an effective starting point to reduce the serious and significant threats posed by counterfeiting.

ABOUT GS1

GS1 is a neutral, not-for-profit organisation dedicated to the design and implementation of global standards and solutions to improve efficiency and visibility in supply chains. It engages a global community of trading partners, organisations and technology providers to understand their business needs and, based on those needs, develops global standards. It is driven by close to two million companies, which execute more than six billion transactions daily in 150 countries with the GS1 System of Standards. GS1 has local member organisations in over 110 countries. Its global office is in Brussels.

Visit our website at **www.gs1.org**

For more information

For more information about how the GS1 System of Standards can improve your visibility-driven business processes, contact your **local GS1 organisation** at **www.gs1.org/contact.**

More detailled information about the GS1 System of Standards can be found in the **GS1 System Architecture** and the **GS1 System Landscape** papers at: **www.gs1.org/gsmp/process/arch_group**

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