The Value and Benefits of the GS1 System of Standards

GS1 designs and manages a global system of supply chain standards.

For the last 30 years, GS1 has been dedicated to the design and implementation of global standards for use in the supply chain. GS1 standards provide a framework that allows products, services, and information about them to move efficiently and securely for the benefit of businesses and the improvement of people's lives, everyday, everywhere.

Our standards ensure effective exchanges between companies, and act as basic guidelines that facilitate interoperability and provide structure to many industries.

GS1 standards bring together companies representing all parts of the supply chain – manufacturers, distributors, retailers, hospitals, transporters, customs organisations, software developers, local and international regulatory authorities, and more.

GS1 standards are used by huge multinational chains and by small corner shops, by world-famous brands and by individual craftsmen. These companies, who may in fact have diverging business interests, work together under our leadership to agree upon standards that make the supply chain faster, more efficient, less complex and less costly.

Read more about GS1 at www.gs1.org

At GS1, our vision is a world where things and information about them move efficiently and securely for the benefit of businesses and the improvement of peoples' lives, everyday, everywhere.

Our mission is to be the neutral leader enabling communities to develop and implement global standards providing the tools, trust and confidence needed to achieve our vision.

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The System you can trust

Standards play a variety of critical roles

Perhaps you are an expert on retail supply chain standards; perhaps you are involved in deploying an automatic identification project in the healthcare sector; or a traceability programme in the field of transport and logistics. Or perhaps you're not so closely involved with that aspect of your business or your industry.

But no matter whether you're an expert or not, and no matter how much or how little time and attention you or your organisation gives to standards, you certainly should care about the value and the benefits that standards bring.

Standards are agreements that structure any activity or any industry. They may be rules or guidelines that everyone applies in the same way. They may be an agreed-upon and uniform way of measuring, or describing, or classifying products or services.

Companies care about the value and the benefits that standards bring.

Indeed, well-designed supply chain standards play a very important role in day-to-day business operations: They reduce complexity between and within organisations. They make it easier to make the right decisions about purchasing hardware, software and equipment; and then they reduce the costs of implementation, integration and maintenance. They facilitate collaboration between trading partners in the supply chain, making it quicker and easier to identify items, share information (like order quantities, availability, or specific characteristics), order and receive parts or ingredients from suppliers, or ship goods to customers. They help improve patient safety and reduce medication errors. They enable global traceability and authentication. They improve efficiency.

In short, well-designed standards allow organisations to focus on how to use information rather than how to get information.

Well-designed standards are more important than ever before in the context of today's challenging economy, because they are the foundation for clear, understandable exchanges that keep costs down for everyone by reducing complexity.

With proper standards, the logistics of international supply chains are more efficient, more sustainable, and more profitable.

GS1 creates and manages just such a proper and well-designed system of standards for the global supply chain.

Why choose the GS1 System of Standards

Some companies develop their own proprietary identification, classification and data capture systems. Others use standards that are only functional within the confines of one single industry sector, or one single country.

The GS1 System of Standards is a much better choice, however, because it is global, robust, multi-sector, user-generated, and scalable.

Global

No matter where in the world your company – or its suppliers, or its customers – is based, GS1 standards will function perfectly there. The GS1 System of Standards is truly global.

Robust

Our standards have been purpose-built to be extremely robust. They react and respond predictably, even in unpredictable situations. GS1 Identification Keys are of a fixed length, and all benefit from a "check digit" which helps prevent accidental key stroke errors; GS1 Data Carriers are best-in-class with highly reliable first-time read rates; GS1 Communication Standards have benefited from multiple data accuracy improvements; and together the GS1 System is solid and scalable.

Multi-sector

GS1 standards work within your organisation … and outside of it too. But don't just take our word for it: the GS1 System of Standards has been endorsed by a wide variety of industries. We enjoy strong working partnerships and alliances with a variety of organisations and trade associations, including Efficient Consumer Response (ECR), the Consumer Goods Forum, AIM Global (Association for Automatic Identification and Mobility), and the WCO (World Customs Organization). The global healthcare sector is widely adopting GS1 standards, and a number of national Ministries of Health has regulated their use. Similarly, a Memorandum of Understanding has been signed with the World Customs Organization, which recognises in GS1 a true partner and ally in its efforts to protect borders. Furthermore, for many years, GS1 and GS1 Member Organisations have been actively engaged in UN/CEFACT, the United Nations Centre for Trade Facilitation and Electronic Business; and GS1 has also had a long and fruitful working relationship with ISO, the International Organization for Standardization.

User-generated

All GS1 standards are built and maintained through the GS1 Global Standards Management Process (GSMP), a worldwide collaborative forum. The GSMP is an open and transparent process which brings together volunteers from all industries and from everywhere in the world to identify needs for standards, gather business requirements, document best practices, obtain consensus on solutions, and then develop and implement the resulting supply chain standards.

Scalable

Whether you are a small company or a large one, whether you have one single product or hundreds, the GS1 System of Standards is perfectly suited to your needs. Indeed, if you are a small or specialised company, using the GS1 System is a particularly intelligent choice. Why? Because it's eminently scalable. No matter what the future holds for your business – an expansion of your line of products or services, an extension into new geographies, an acquisition or a merger – with the GS1 System, you are ready.

The better choice

For more than 30 years, GS1's voluntary standards have been providing a framework that ensures effective exchanges between companies and act as basic guidelines that facilitate interoperability and provide structure to many industries. And though they were originally created by manufacturers and retailers to improve the efficiency of the distribution of food and consumer goods to supermarkets, GS1 standards are used today by more than a million companies in dozens of sectors including healthcare, transportation and logistics, chemicals, high tech – and still, of course, the retail supply chain.

How the GS1 System of Standards works

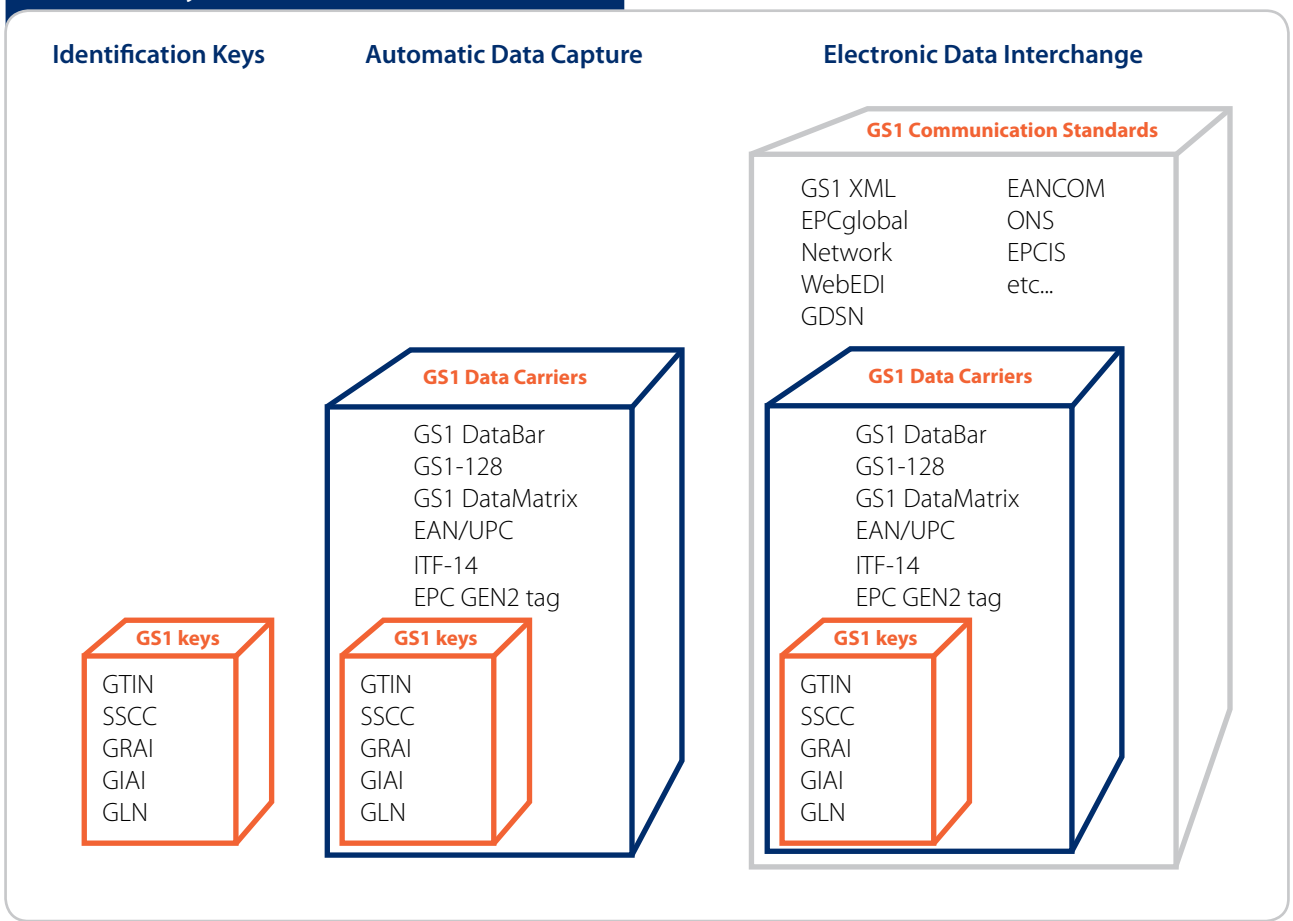
The GS1 System of Standards is a flexible architecture that ensures maximum efficiency. It is built around and upon two main elements: GS1 Automatic Identification Standards and GS1 Communication Standards.

GS1 Automatic Identification Standards are themselves composed of several elements: GS1 Identification (ID) Keys and Application Identifiers, GS1 Data Carriers and the EPC Identifier.

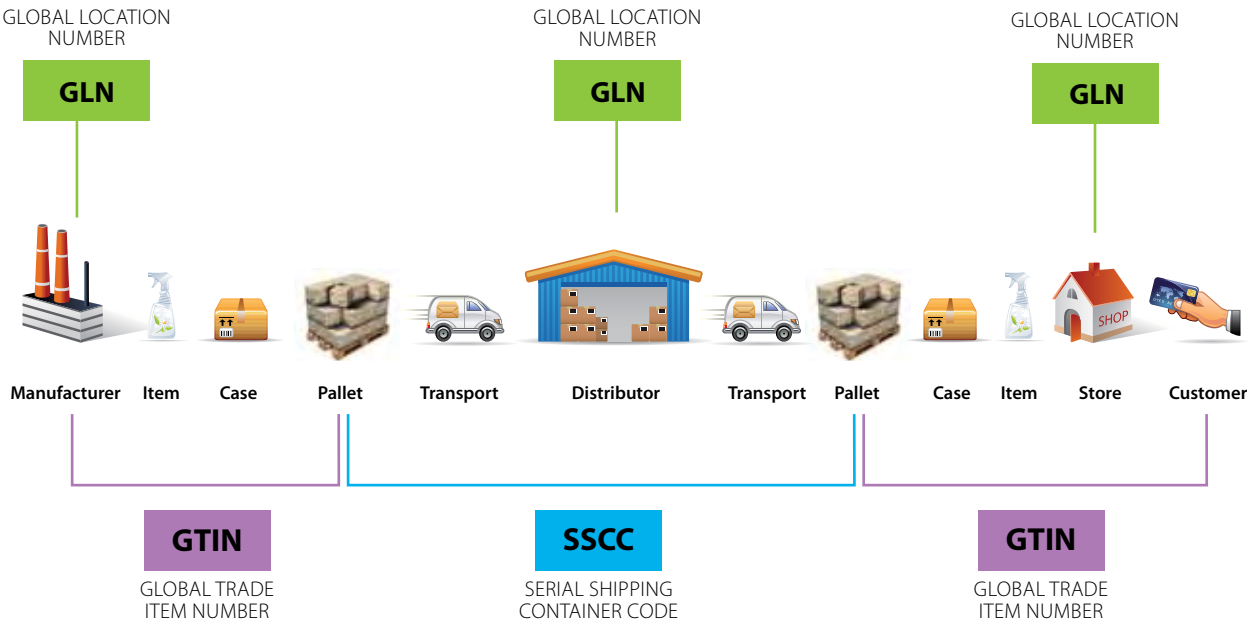
GS1 ID Keys and Application Identifiers are specially designed to work with the GS1 Data Carriers: GS1 BarCodes or EPC/RFID tags. The EPC, which incorporates GS1 Identification Keys as well as Keys from other systems, is the foundation for encoding an EPC/RFID tag.

GS1 Communication Standards deal with transactional data, which is data that acknowledges the completion of a business transaction such as one supported by GS1 eCom standards; they deal with visibility data, which is data that logs the occurrence of a physical event (item loaded onto ship, item arrived in port, item inspected at customs…) in EPCIS; and they enable master data sharing between trading partners in the supply chain using the Global Data Synchronisation Network (GDSN). Billions of times each day, the GS1 System of Standards connects physical things such as products, locations, logistics units, and assets with information about those things supplied by GS1 Communication Standards.

The GS1 System



Identify



Capture

BAR CODES — GS1 SYSTEM DATA CARRIERS — **EPC/RFID**

Share

Item Data | Price and Promotion Data | Shipping Notice | Invoice | Product Recall | Request For Quotation | Planning Schedule | Purchase Order

Interoperable building blocks

The GS1 System has been designed to ensure that all of the elements are compatible and interoperable with each other.

As a result, they can be deployed in ways that meet very specific customer needs – and at the same time are compatible with future process changes in the supply chain, or new additions to the GS1 Standards family.

GS1 Automatic Identification

GS1 Identification Keys & Application Identifiers

GS1 Data Carriers

The Electronic Product Code (EPC)

GS1 Identification Keys

GS1 Identification Keys are used to name and distinguish any object, thing or location, so interested parties can get information or business messages related to them.

The main GS1 ID Keys are:

GTIN – Global Trade Item Number

Global Trade Item Number (GTIN-13 Structure)	
GS1 Company Prefix → ← Item Reference	Check Digit
N_1 N_2 N_3 N_4 N_5 N_6 N_7 N_8 N_9 N_{10} N_{11} N_{12}	N_{13}

GLN – Global Location Number

Global Location Number Structure	
GS1 Company Prefix → ← Location Reference	Check Digit
N_1 N_2 N_3 N_4 N_5 N_6 N_7 N_8 N_9 N_{10} N_{11} N_{12}	N_{13}

SSCC – Serial Shipping Container Code

SSCC (Serial Shipping Container Code)		
Extension Digit	GS1 Company Prefix → ← Serial Reference	Check Digit
N_1	N_2 N_3 N_4 N_5 N_6 N_7 N_8 N_9 N_{10} N_{11} N_{12} N_{13} N_{14} N_{15} N_{16} N_{17}	N_{18}

The other GS1 ID Keys are:

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

GTIN - Global Trade Item Number

The Global Trade Item Number, or GTIN, is one of the main building blocks of the GS1 System.
GTIN is used to uniquely identify trade items, which are products and services that are priced, ordered or invoiced at any point in the supply chain, whether at the checkout, in a warehouse, in an electronic catalogue or elsewhere. Each trade item that is different from another is allocated its own separate GTIN.

The GTIN is used to uniquely identify trade items. Each trade item that is different from another is allocated its own separate GTIN.

Their main function is to provide a way to uniquely identify any item so it can be looked up in a database – for example to get its price, record its sale, confirm its delivery or identify its order – and this, at any point during the supply chain and from any place in the world.

GTINs provide accuracy, speed and efficiencies to millions of companies around the world, in all areas of modern business.

There is also a serialised form of the GTIN: a **Serialised GTIN** identifies the specific instance of a trade item. For example, serialised GTINs are used in the healthcare sector to distinguish individual implants which are otherwise of the same brand and characteristics; or in tyre production

to differentiate individual tyres so that they can be tracked through their lifecycle. Serialised GTINs, for example, enable tyres on commercial lorries to be maintained at proper intervals and withdrawn from use when they have been in circulation a certain amount of time.

The GTIN is the world's most widely used identification system with global uniqueness guaranteed by the structure:

a. GS1 Prefix: Provides a number capacity to each GS1 Member Organisation and enables local administration
b. Company number: Combined with the GS1 Prefix this forms the GS1 Company Prefix allowing companies to allocate GTIN and other GS1 ID Keys
c. Item Reference: Allocated by the company with each different product receiving a different number
d. Check Digit: Calculated from all other digits to provide extra security

The GTIN is supported, promoted and obtainable from any GS1 Member Organisation anywhere in the world.

GLN - Global Location Number

The Global Location Number, or GLN, is the GS1 ID Key used to identify locations and legal entities.

Locations can be a physical place such as a warehouse, a storage cabinet or even a specific shelf within a store; they can be a legal entity such as a company, or division of a company; or they can be a function that takes place within a legal entity, such as the accounting department of a company or the paediatrics ward of a hospital.

The GLN identifies any location anywhere in the world in a unique way.

Being able to identify locations with a unique number is vital to many business processes; GLNs are also the essential building block for a variety of EPC/RFID applications built around event capture.

Using a GLN rather than a proprietary internal numbering system for locations gives a company significant advantages, because it provides a standardised way to uniquely identify locations important to the supply chain.

(414) 0950110102098

a b c d

The GLN is a multi-sector global solution for identifying locations at whatever level of granularity is needed. This ISO-compliant identifier removes the need for complicated proprietary location numbering systems. Its global uniqueness is guaranteed by its structure:

a. GS1 Application Identifier: Provides the meaning of the data field which follows, allowing the same GS1 Data Carrier to encode multiple data
b. GS1 Company Prefix: Allocated by GS1 Member Organisations to member companies enabling them to allocate GLNs
c. Location Reference: Allocated by the location owner with each different location receiving a different number
d. Check Digit: Calculated from all other digits to provide extra security

The GLN is supported, promoted and obtainable from any GS1 Member Organisation anywhere in the world.

SSCC – Serial Shipping Container Code

The Serial Shipping Container Code (SSCC) is the GS1 ID Key used to identify individual logistic units.

A logistic unit can be any combination of units put together in a carton, in a case, on a pallet or on a truck, where the specific unit load needs to be managed through the supply chain. The SSCC enables a unit to be tracked individually, providing benefits for order and delivery tracking and automated goods-receiving.

The serial reference component of the SSCC provides virtually unlimited number capacity, simplifying number allocation and guaranteeing unique identification.

The SSCC identifies individual logistic units, like cartons, crates, or pallets.

As the SSCC provides a unique number, it can also be utilised as a look-up number to provide not only detailed information regarding the contents of the load, but also as part of an Advanced Shipping Notice (ASN) or Despatch Advice process. Furthermore, with an SSCC, a company can reliably look up details about complex loads, which saves the sender from having to encode long consignment information on individual logistic unit labels.

The SSCC links barcode or EPC/RFID tag information to electronic communications about the logistic unit. SSCCs are ISO licence plate-compliant (ISO/IEC 15459) for tracking and tracing logistic units. Its structure:

a. GS1 Application Identifier: provides the meaning of the data field which follows, allowing the same GS1 Data Carrier to encode multiple data
b. Extension Digit: allocated by the user to increase capacity
c. GS1 Company Prefix: Allocated by GS1 Member Organisations to member companies enabling them to allocate SSCCs
d. Serial Reference: Allocated by the creator of the logistic unit with each logistic unit receiving a different number
e. Check Digit: Calculated from all other digits to provide extra security

The SSCC is supported, promoted and obtainable from any GS1 Member Organisation anywhere in the world.

Other GS1 ID Keys

GSRN – Global Service Relation Number

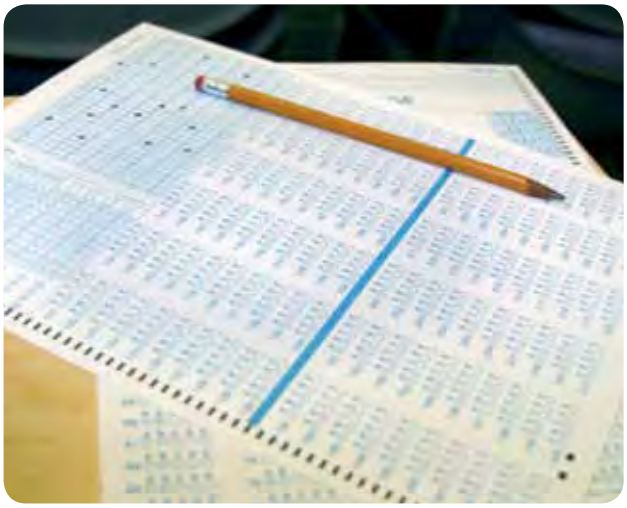
The Global Service Relation Number is the GS1 ID Key used to identify a service relationship between a business and a client, such as club membership, loyalty programmes, or a patient in a hospital.

GRAI – Global Returnable Asset Identifier

The Global Returnable Asset Identifier (GRAI) is one of the two GS1 ID Keys for asset identification. As its name indicates, the GRAI is used to identify returnable assets such as re-usable transport equipment like trays, crates, pallets or beer kegs that are used and then returned to be used again. The GRAI can be used simply for asset identification and tracking purposes, or it can be part of a hiring or rental system where two or more companies collaborate, as it allows enterprises to scan assets into and out of their businesses.

GIAI – Global Individual Asset Identifier

The Global Individual Asset Identifier (GIAI) is the second of two GS1 ID Keys for asset identification. GIAIs are used to identify fixed assets of any value within a company that need to be identified uniquely, such as a computer, a desk, a vehicle or a component part. Having a unique identifier for their assets allows a business to identify, track and manage them across their entire life. They provide a quick way to be able to look up an asset in a database so its use, location or state can recorded, for example for stock reconciliation, to update a maintenance record, to register a software upgrade or to assign an asset to a user or location.



GDTI – Global Document Type Identifier

The Global Document Type Identifier (GDTI) is the GS1 ID Key to identify a document by type. The term "document" here is applied broadly to cover any official or private papers that infer a right (e.g., a proof of ownership) or an obligation (e.g., call for military service) upon the bearer. Other examples of the kinds of documents that could have a GDTI are tax demands, proof of shipment forms, insurance policies, internal invoices, nationalised or standardised exams, and passports. A company or business will issue a GDTI where it is important to maintain a record of the document; the GDTI will provide a link to the database that holds the 'master' copy of the document.

GSIN – Global Shipment Identification Number

The Global Shipment Identification Number (bill of lading) is a number assigned by a seller (sender) of the goods. It provides a globally unique number that identifies a logical grouping of physical units for the purpose of a transport shipment.

GINC – Global Identification Number for Consignment

The Global Identification Number for Consignment identifies a logical grouping of goods (one or more physical entities) that has been consigned to a freight forwarder or carrier and is intended to be transported as a whole.

GS1 Application Identifiers

The GS1 ID Keys are complemented by the GS1 Application Identifiers (or GS1 AIs).

GS1 AIs act like a code list of generic and simple data fields for use in multi-sector and international supply chain applications. Each GS1 AI consists of two or more digits and provides the definition, format and structure of the data field encoded in a GS1 Data Carrier. For example, a GS1 AI exists for each GS1 ID Key, allowing it to be encoded in GS1 BarCodes or EPC/RFID tags.

Supplementary data is always associated with a GS1 ID Key and, while the intention is that the GS1 ID Key is used to find information about the identified object in a database, GS1 AIs exist for supplementary data that cannot be looked up in a database by reference to the GS1 ID key. This could happen if data is needed when connection to a database is not available; or when a batch number, expiration date or individual instance of the object is required in barcode or EPC/RFID tag form. For example, the SSCC provides a unique reference number that can be used as the key to access all relevant information regarding the logistic unit in computer files. However, supplementary data relating to the logistic unit (e.g., ship-to information, logistic weights, et cetera) is also available as standardised supplementary data because access to this data might be needed when the goods are in transit and connection to a network is impracticable.

GS1 AIs, and the associated application guidelines, have been designed for international and multi-sector purposes. The AIs allow multiple data to be encoded in a single GS1 Data Carrier, thus improving read rates and reducing print and production costs.

GS1 AIs present a standardised way to encode information in a single GS1 Data Carrier.

GS1 Data Carriers

GS1 has an entire portfolio of Data Carriers: different kinds of media that can hold GS1 ID Keys and attribute data. The same content can, in fact, be encoded onto different kinds of carriers, depending on what use will be made of it.

EAN/UPC BarCodes

If a company wants to put a barcode on a trade item that can be scanned at any retail point of sale anywhere in the world, they need an EAN/UPC barcode.

The GS1 EAN/UPC barcode is the longest-established and most widely used GS1 Data Carrier. It is an indispensable product-marking method that is found on virtually every consumer product in the world. That little "beep" that people associate with the checkout of a supermarket is a laser scanning device reading the information encoded in an EAN/UPC barcode.

There are four primary EAN/UPC barcode types, and all are linear symbologies.

- EAN-13 which encodes GTIN-13
- UPC-A which encodes GTIN-12
- EAN-8 which encodes GTIN-8
- UPC-E which encodes a special "zero-suppressed" GTIN-12

EAN/UPC does not encode any other GS1 ID Key or any other GS1 Application Identifier.

There are two supplementary EAN/UPC barcodes called the 2-digit and 5-digit add-on codes whose use is limited almost exclusively to books and periodicals.

Besides its global ubiquity, the other great advantage of the EAN/UPC barcode is its omnidirectional scanning capability: an EAN/UPC barcode can be passed in front of a bar code reader at a point of sale right-side-up or upside-down, and it will still "beep" properly. This makes it a quick and efficient data carrier for high-volume scanning situations like supermarket cash registers.

ITF-14

ITF-14 barcodes only encode GTINs. Because they cannot be used to identify items that will cross a point of sale, they are usually used for trade items where printing directly onto corrugated cartons is required.

GS1-128

When it comes to logistics, the GS1-128 Data Carrier is the gold standard. GS1-128 barcodes can carry all GS1 ID Keys, as well as variable information like serial numbers, expiration dates dates, and measures.

It is a linear symbology, with the advantage of being more compressed than other linear technologies.

GS1-128 cannot be used to identify items crossing a retail point of sale; instead, its main role is in the transport and logistics sector and the healthcare sector. The GS1-128 bar code has taken on considerably greater importance in recent years, owing to the increasing requirements of more stringent product traceability: indeed, a transport label with a GS1-128 barcode on it is the centrepiece of any global standards-based tracking and tracing system.

GS1-128 is very flexibly configurable, making it quite adaptable to a wide variety of needs and use cases.
It can be read with a variety of commercially available laser scanners.

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GS1-128

GS1 DataBar

GS1 DataBar symbols can carry more information and identify smaller items than EAN/UPC barcodes can and can be also scanned at retail point of sale. As a result, GS1 DataBar enables GTIN identification for fresh variable-measure and hard-to-mark products like loose fruit and vegetables, jewellery and cosmetics.

Additionally, GS1 DataBar can carry GS1 Application Identifiers such as serial numbers, lot numbers, and expiration dates, creating solutions to support product authentication and traceability for fresh food products and couponing.

GS1 DataBar symbols were endorsed and adopted by GS1 after a compelling business case review by a global task force composed of retailers, fast-moving consumer goods manufacturers, pharmaceutical companies, GS1 Member Organisations, and trade associations.

The decision of whether to use GS1 DataBar symbols or not will be left to the brand owner (the party responsible for specifying package design), as it is not obligatory to replace EAN/UPC barcodes where they work today. The date when GS1 DataBar can be used openly is set for 2014 at a global level, but earlier dates are being established on a country-by-country basis for specific applications (e.g., coupons in the USA in 2011, loose produce rolling out 2010 to 2014 in different markets).

(01) 0 9501101 02094 8

GS1 DataBar Stacked Omnidirectional

Mainly used for marking individual pieces of loose produce

(01) 0 9501101 02091 7 (15) 010111

GS1 DataBar Expanded Stacked

Mainly used for handling coupons and for marking variable measure trade items, e.g. meat, cheese,…

GS1 DataMatrix

Unlike the other GS1 symbologies, GS1 DataMatrix is a two-dimensional symbology that allows a wealth of information to be encoded in a very compact space. However, it is not intended to be used at high volume "omni-directional" retail point-of-sale environments like supermarkets, because it is only compatible with applications whose reading systems use camera-based scanners.

A particularly noteworthy feature of the GS1 DataMatrix is that it can be used to apply markings directly to products, components, or individual parts. In such cases, the code is etched or laser-engraved directly onto the surface of an item, making it indelible, even under harsh operating conditions. For example, a GS1 DataMatrix engraved in this way can be used in the presence of grease in industrial applications or for items that are exposed to the elements. This makes the GS1 DataMatrix quite suitable for applications whose conditions do not allow for the use of conventional barcodes.

GS1 DataMatrix is gaining popularity in the healthcare sector, as it meets many needs and opens up many opportunities to improve patient safety. For example, because it can carry GS1 Application Identifiers, batch and serial numbers and expiration dates can be encoded onto medical products. Moreover, due to its compact size, a GS1 DataMatrix symbol can fit onto just about any medical device. In the past, individual surgical instruments could not be labelled automatically. However a GS1 DataMatrix can be marked directly onto such instruments, thus simplifying their tracking and tracing in hospitals. Based on its popularity, GS1 DataMatrix is being promoted for use in retail pharmacies and all regulated trade item scanning environments.

(01)09501101020931

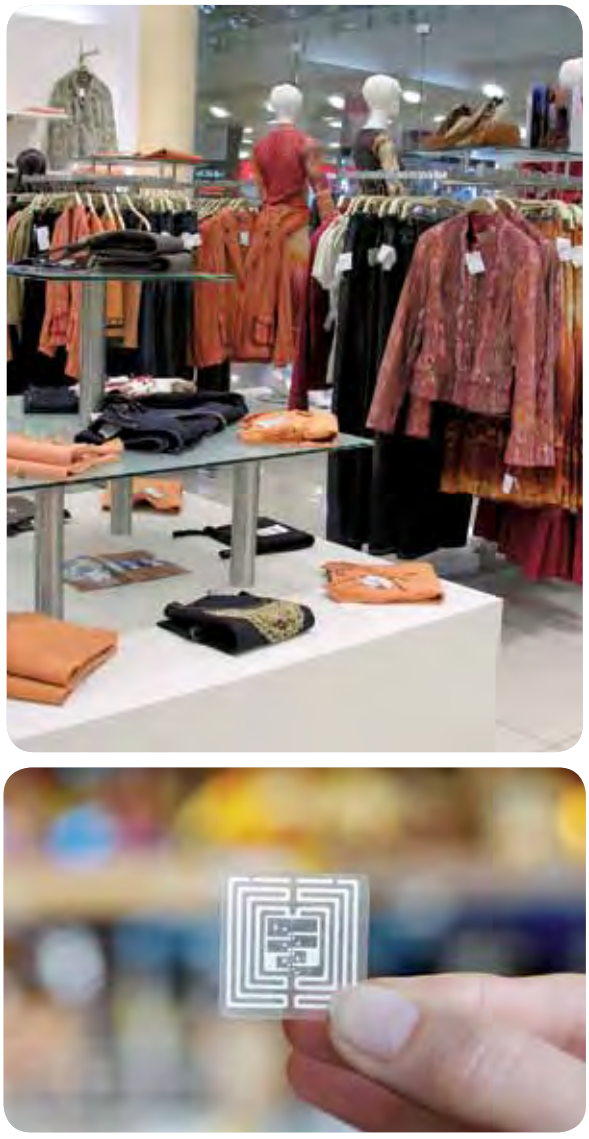
GS1 DataMatrix

EPC/RFID tags

EPC/RFID tags use Radio-Frequency Identification technology to encode GS1 ID Keys in the GS1 Electronic Product Code (EPC). They also enable the EPCIS GS1 Communication Standard.

RFID works via a microchip, which stores the relevant data (including the EPC) and reflects the data to a reader-antenna by means of electromagnetic waves. Since these waves can pass through solid materials, the chips may be shielded by adhesive film or integrated directly inside the packaging or product.

EPC/RFID tags encoding the GS1 EPC can offer a significant time-saving advantage over other GS1 Data Carriers: The reader and transponder do not need to be in each other's line of sight and the transmission/reading process is ultra-rapid, which means that this Data Carrier has bulk data capture capabilities – an entire supermarket caddy could be "scanned" in the blink of an eye, without needing to manually pass each item in front of a scanner. Right now, however, the most exciting live-use cases take advantage of this data carrier's ability to provide exact product localisation – for example in a warehouse – resulting in optimised time-management for product delivery processes.



EPC/RFID Tags

The Electronic Product Code (EPC)

The Electronic Product Code (EPC) is an emerging way to globally identify physical objects, loads, locations, assets, and other entities whose use is to be tracked with Radio Frequency Identification (RFID) tags or barcodes via the EPC Network.

The EPC includes all the GS1 ID Keys, ensuring full interoperability with existing systems, and also encompasses several other naming structures. This allows other existing naming structures managed by agencies outside GS1 to be incorporated into the EPC system, while maintaining compatibility with existing GS1 System naming structures. This helps ensure wide adoption of the EPCIS.

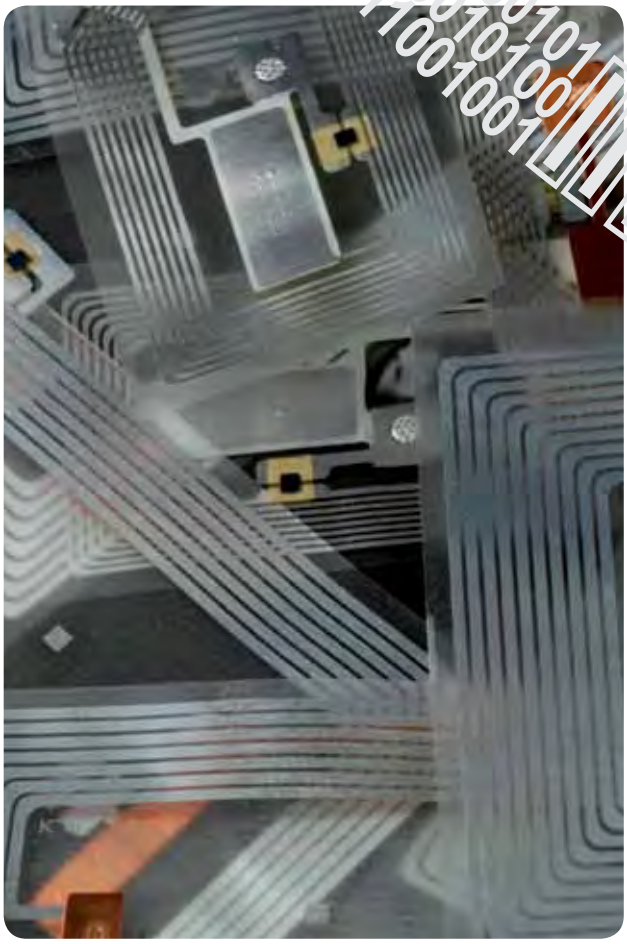
The EPC benefits from a decentralised assignment method that is nevertheless completely compatible with the GS1 System. The EPC has been designed so that independent organisations can assign new EPCs without the possibility of collision.

The EPC is the foundation for encoding an EPC/RFID tag or a GS1 BarCode. It can be used to access information from the EPC Network.

Today, all EPC-identified objects are serialised, which means they carry a unique serial number: An EPC assigned to one object is thus different than an EPC assigned to another. This allows unique, accurate and specific identification of individual objects.

For every GS1 ID Key that names a unique entity's instance in the EPC Network, there is an equivalent EPC. This provides compatibility and interoperability with systems based on GS1 ID Keys. For example, GS1 SSCC, GS1 GTIN plus a serial number and GS1 GIAI Keys can create valid EPCs.

The EPC is the foundation for encoding an EPC/RFID tag or a GS1 BarCode, which will be used to access information from the EPC Network.



GS1 Communication Standards

Master data sharing with GS1 GDSN

Transactional data with GS1 eCom

Visibility data with EPCIS

GS1 Communication Standards are another key element of the GS1 System of Standards.

GS1 Communication Standards enable master data sharing between trading partners in the supply chain and treat transactional data and visibility data.

Master Data Sharing with GS1 Global Data Synchronisation Network

The GS1 Global Data Synchronisation Network, or GDSN®, is another GS1 Communication Standard.

The GDSN is built around the GS1 Global Registry, GDSN-certified Data Pools, the GS1 Data Quality Framework and GS1 Global Product Classification, which, when combined, provide a powerful environment for secure and continuous synchronisation of accurate data.

With GDSN, business partners always have the latest information in their systems, and any changes made to one company's database are automatically and immediately provided to all of the other companies who do business with them. When a supplier and a customer know they are looking at the same accurate and up-to-date data, it is smoother, quicker and less expensive for them to do business together. The GDSN provides a single point of truth for product information. Synchronising accurate, properly classified data also results in improved accuracy of orders, fewer forms to fill out, fewer duplicate systems and processes, and, most importantly, a proven way to drive unnecessary costs out of the supply chain.

The **GS1 Global Registry** is the GDSN's "network facilitator and information directory" that guarantees the uniqueness of the registered items and parties. It provides data pools critical information to establish data synchronisation communications in the network and ensures they are using a standard set of messages, validation rules, and processes.

GDSN-certified Data Pools are electronic catalogues of standardised item data. They serve as a source and/or a recipient of master data. Data Pools can be run by a GS1 Member Organisation or by a solution provider. An up-to-date list of all GDSN-certified Data Pools is always available at www.gs1.org/gdsn.

GDSN calls for data quality programmes that are sustainable and focused on the long term: experience has shown time and again that business benefits come not from enacting short-term curative data cleansing actions, but only from having good quality data from the start. To help ensure this level of data quality, GDSN recommends the processes described in the GS1 Data Quality Framework. The **GS1 Data Quality Framework** uses GS1 standards and fits perfectly into GDSN. For suppliers, it enhances internal processes and guarantees the good quality of data that is shared. For retailers, hospitals, pharmacies and other data recipients, it helps ensure that they have the means to receive and use proper information.

To ensure products are classified correctly and uniformly, GDSN uses **GS1 Global Product Classification** (GPC), a system that gives buyers and sellers a common language for grouping products in the same way, everywhere in the world. This improves the Global Data Synchronisation Network's data accuracy and integrity, speeds up the supply chain's ability to react to consumer needs and contributes to breaking down language barriers. It also facilitates the reporting process across product silos. The foundation of GPC is called a "brick". GPC bricks define categories of similar products. Using the GPC brick as part of GDSN ensures the correct recognition of the product category across the extended supply chain, from seller to buyer.

GDSN enables secure and continuous synchronisation of accurate data.

Transactional Data with GS1 eCom

Every day in companies around the world, hundreds of millions of business transactions take place: orders, order responses, despatches, payments and more. And with increasing regularity, these transactions are being handled electronically.

GS1 eCom Communication Standards come into play here: by unambiguously identifying the products, services and parties involved in any transaction, it enables these electronic exchanges to be smoothly compatible, between companies, and also across borders and across industries.

By using GS1 Identification Keys such as GTIN, GLN and SSCC, GS1 eCom enables the direct integration of data captured during the scanning of products sold in retail, during logistic activities and so forth. It saves users from a costly and time-consuming mapping of proprietary identification schemes – because the same GS1 ID Keys which are used to collect data at the retail point of sales or during logistic activities while despatching and receiving of goods are also used here.

Both GS1 EANCOM and GS1 XML enable electronic business transactions.

GS1 eCom provides two complementary standards: GS1 EANCOM and GS1 XML. They both allow a direct link between the physical flow of goods or services, and information related to them.

GS1 EANCOM

GS1 EANCOM® is a GS1 eCom Communication standard based on UN/EDIFACT (United Nations Electronic Data Interchange for Administration, Commerce and Transport), which is a set of internationally agreed-upon standards, directories and guidelines for the electronic interchange of data.
The GS1 EANCOM standard covers the functions required to effect a complete trade transaction:

- messages which enable the trade transaction to take place, e.g. price catalogue, purchase order, invoice, et cetera

- messages used to instruct transport services to move the goods messages used in settlement of the trade transactions through the banking system

The messages available in GS1 EANCOM can be divided into the following categories:

- **Master Data Messages**, such as the name, address, contact persons, financial accounts, et cetera

- **Business Transactions Messages**, such as terms of delivery, payment terms, price, allowances and charges, messages related to orders and subsequent changes to them, information related to despatch, transport and receipt, and messages related to the payment of the goods supplied

- **Report and Planning Messages**, which provide valuable and up-to-date reports and forecasts concerning delivery, sales and stocks so partners can plan their activities and their marketing strategies

- **Syntax and Service Report Messages**, which may be sent to acknowledge or refuse an interchange

- **Security Messages** used to transmit a digital signature, to verify the signature, and to provide references to the data secured

GS1 XML

GS1 XML is another GS1 eCom Communication standard. It provides a standardised and predictable structure for electronic business messages, enabling business partners to communicate business data rapidly, efficiently and accurately, irrespective of their internal hardware or software types.

XML is an industry acronym for "eXtensible Markup Language," a programming language that was designed for information exchange over the Internet. GS1 XML standards can be freely downloaded from www.gs1.org GS1 was one of the first standards organisations to publish a global XML-based business standard, and the GS1 XML currently contains more than 60 "document" XML messages, not counting supporting messages from the common library.

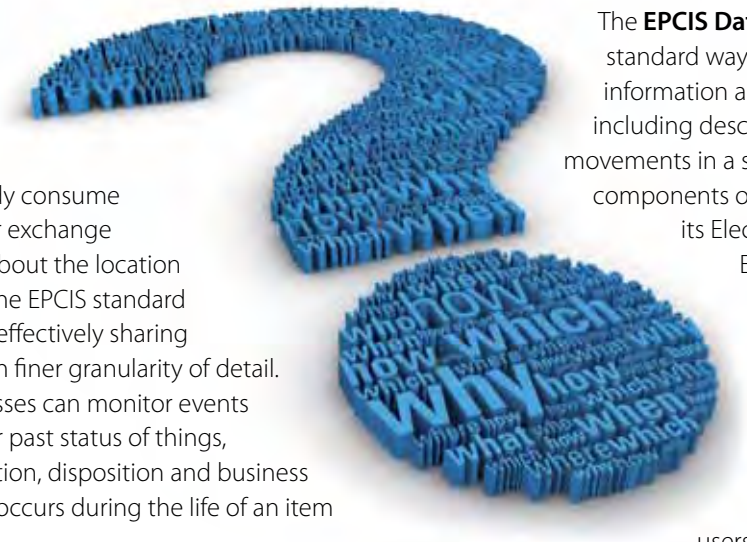
GS1 XML messages are also used in the Global Data Synchronisation Network and in event management enabled by RFID via GS1 EPCglobal. GS1 XML is designed in such a way that the messaging is transport agnostic. It is very simple to exchange GS1 XML documents using any technical solution or profile, including Web Services.

Like GS1 EANCOM, GS1 XML is fully compliant with UN/CEFACT methodology. GS1 is engaged in UN/CEFACT's management structure and its working groups and is working to further develop UN/CEFACT standards and incorporate its profiles into the GS1 XML suite.

GS1 Communication Standards: Visibility Data with EPCIS

Electronic Product Code Information Services, or EPCIS, is another GS1 Communication Standard.

EPCIS is an interface standard for exchanging event-related information. It answers four powerful questions for any GS1 ID Key: What? Where? When? Why? It can provide visibility into object events, aggregation events, quantity events, and/or transaction events. EPCIS is the bridge between the physical world and business information systems.



Most manufacturers, distributors, logistics providers, resellers or large end users of tangible goods already consume information internally or exchange information externally about the location and status of material. The EPCIS standard provides a way for cost-effectively sharing information with a much finer granularity of detail. Thanks to EPCIS, businesses can monitor events and know the current or past status of things, including the time, location, disposition and business step of each event that occurs during the life of an item in the supply chain. EPCIS facilitates internal data capture and enables secure external sharing of information about movement and status of goods in the physical world. Visibility information in EPCIS takes the form of "events" that describe specific occurrences in the supply chain. An EPCIS event, for example, will state for a unique EPC identified object (what) that it was received (business step) in a non-sellable condition (disposition) at Distribution Centre X (location) yesterday (when) at 2pm EDT (time).

EPCIS answers the questions: What? Where? When? Why?

The EPCIS standard specifies a data model and two interfaces:

The **EPCIS Data Model** specifies a standard way to represent visibility information about physical objects, including descriptions of product movements in a supply chain. The main components of the data model include its Electronic Product Code, Event Time, Business Step, Disposition, Read Point, Business Location and Business Transaction. The data model is designed to be extendable by industries and end users without revising the specification itself. For example, EPCIS pilots have included extensions such as Expiration Date, Batch Number and Temperature.

The **EPCIS Event Capture Interface** specifies a standard way for business applications that generate visibility data to communicate that data to applications that wish to consume it. In many cases, the receiving side of the Event Capture Interface will be a repository, but this is not obligatorily the case.

The **EPCIS Query Interface** provides a standard way for internal and external systems to request business events from repositories and other sources of EPCIS data using a simple, parameter-driven query language. There are two types of queries – Poll Queries for a synchronous, on-demand response, and Subscription Queries for an asynchronous, scheduled response.

How GS1 Standards are made

Since 2002, the Global Standards Management Process, or GSMP, has been the pre-eminent worldwide collaborative forum where all GS1 standards are built and maintained by a community of our users. In 2008, the GSMP combined with the EPCglobal Joint Action Group (JAG) to become the single standards development forum for all of GS1. This new GSMP is the engine that powers the entire GS1 System of Standards. It is an open and transparent process made possible by the participation of companies who wish to improve the efficiency of supply chains.

Building standards that truly improve supply chain efficiency is a collaborative effort requiring participation from a wide range of stakeholders. We need you to make it work! Join the GSMP as a member (with voting rights) or as a participant (without voting rights). Read more at www.gs1.org/gsmp

GS1 standards are built and maintained collaboratively by volunteers from across the world

The GSMP brings together users from all industries and from everywhere in the world to identify needs for standards, gather business requirements, document best practices, obtain consensus on solutions and then develop and implement the resulting supply chain standards.

User involvement is the basis of the GSMP: work is accomplished via a committee structure that allows our users to participate in the way that brings the most value to their organisation in the most efficient manner. The GSMP's membership is a richly diverse community from around the world, numbering over a thousand individuals from all kinds of organisations, including suppliers, retailers, 3PLs, solution providers, purchasing organisations, healthcare providers, and more.

In the last six years, the GSMP has processed over 1,000 changes which have enhanced the GS1 System and enabled its application and deployment in a myriad of new business contexts.

To properly treat these requests, the GSMP uses a methodology that guarantees a robust, stable and timely solution at the end of the production chain.

The System you can trust

The System you can trust to improve lives and benefit businesses

Every year, families around the world spend thousands of dollars (or euros, or any of hundreds of other currencies) at the supermarket – and almost all of that spending is registered thanks to the "beep" of a barcode passing through a scanner.

We all have so much faith in barcodes that we implicitly trust that "beep" to send the correct price and product information to the cashier, and indeed that trust is very well deserved, because the reliability and security of the GS1 BarCodes on the items in your shopping caddy is beyond reproach.

The GS1 System of Standards is global, robust, multi-sector, user-generated, and scalable, and it is used today by millions of companies across dozens of industry sectors.

In order to get their products to your supermarket's shelves, most companies use not only GS1 BarCodes, but also a variety of other elements of the GS1 System: other GS1 Data Carriers like GS1 DataBar or an EPC/RFID tag, GS1 Identification Keys, GS1 Communication Standards.

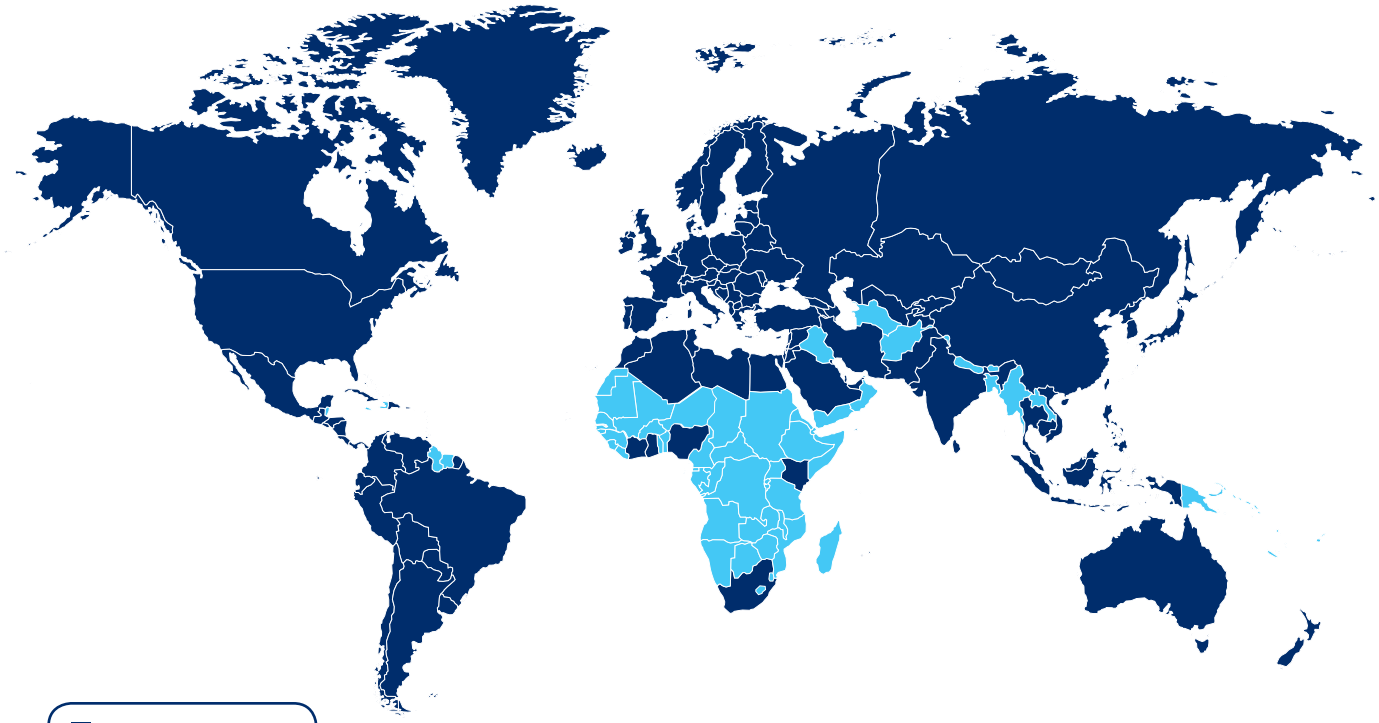
The GS1 System of Standards is global, robust, multi-sector, user-driven, and scalable; and it is used and endorsed by millions of companies. Thanks to it, companies and organisations in the retail supply chain, in the healthcare sector and in many other industries and sectors can manage their day-to-day business with the same feeling of reliability and efficiency as that barcode "beep" produces in consumers at the supermarket checkout.

Interested in learning more about what the GS1 System of Standards could do for your business?

Then simply contact your local GS1 Member Organisation. We're present in 108 countries around the globe. Find the GS1 Member Organisation in your country on our website at www.gs1.org/contact

107 Member Organisations serving 150 countries:

Local services, global reach.



- Countries with a GS1 Member Organisation
- Countries served on a direct basis from GS1 Global Office

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