



## GS1 System overview

What the system provides

Supply chain identification

Global data synchronisation

Bar codes and Radio  
Frequency Identification tags

Electronic business messages

Global standards, local  
support

Working with solution  
providers





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# Introduction



The GS1 System (formerly the EAN.UCC System) provides global standards for identification, data synchronisation, automatic data capture, and electronic communications in all trade and industry sectors. It enables companies to bar code their products, use radio frequency tags, exchange information electronically, and use scanning and reading systems to track and trace items all the way from production, through distribution and retail, to the final customer or consumer.

Developed in the early 1970s in America by the Uniform Code Council, and extended in the late 1970s for global use by EAN International, the GS1 System is now used by over one million organisations worldwide as the basis for improved supply chain management systems. The system is managed globally by GS1, a non-profit making association based in Brussels.

GS1 UK is the UK authority for the GS1 System and it was established in 1976 to promote and develop the use of the system for the benefit of British business. It now has over 21,000 member companies and works closely with other GS1 national organisations to ensure that new developments meet changing business requirements.



# What the system provides



The GS1 System provides companies with unique identifiers for products and services, companies and locations, logistics units, fixed assets, returnable assets and service relationships. These identifiers can then be shown in bar codes or Radio Frequency Identification (RFID) tags which can be scanned or read automatically as items are handled in the supply chain. These bar codes and radio frequency tags are specially reserved for the GS1 System which means that they cannot be confused with any other proprietary bar coding or tagging systems.

These sets of unique numbers have no meaning which means that all the information about the items being identified must be exchanged between trading partners before trade can begin. This is known as global data synchronisation and GS1 provides standards for the way in which all this information is published and made accessible to both existing and prospective trading partners.

As well as enabling companies to use global standards for identification, bar coding and radio frequency tagging, GS1 provides electronic business message standards to replace paper-based orders, despatch advices, invoices, credit notes and so on. These messages can be processed automatically, without human involvement and they allow information about the performance of the supply chain to be exchanged in real-time between trading partners.

## In summary the GS1 System provides

- global standards for supply chain identification
- global data synchronisation
- bar codes and radio frequency tags for automatic data capture
- electronic business message formats for automatic supply chain communications

## The benefits of using the GS1 System are

- one global standard for identification and communication in all trade and industry sectors
- ability to identify, track and trace items automatically throughout the supply chain
- faster and more accurate delivery of products and services
- improvements in stock management and reductions in stock holdings
- fewer products out of stock
- greater efficiency in space management
- reduced working capital
- improved supply chain visibility
- real-time data about manufacturing, distribution and retailing performance
- improved management of company assets
- greater productivity at the point of sale
- reduced costs and improved service for customers



# Supply chain identification



The GS1 System allows companies to create unique identifiers for the following items

- products and services
- companies and locations
- logistics units
- fixed assets
- returnable assets
- service relationships

Each user of the GS1 System is allocated a unique company prefix number when they join their national GS1 member organisation such as GS1 UK. This unique prefix number guarantees that all the identifiers formed from it will be unambiguous worldwide.

## Products and services

The most commonly used numbers are called Global Trade Item Numbers (GTINs) and they are used to identify any product line or service that is planned, ordered, priced or invoiced in the supply chain. These numbers are used to identify individual product lines sold at the retail point of sale and the outer cases in which they are traded between companies.

As well as enabling the unique identification of a product line, the GS1 System also provides a standard for providing attribute information about a product. This is information that cannot easily

be looked up from a computer system, for example, batch or serial numbers, best before or expiry dates. This means that users can track and trace products accurately and automatically as they move along the supply chain. Information about particular items can be easily shared between companies to enable full traceability from production through to disposal and recycling.

## Companies and locations

All the companies and locations in the supply chain can be identified with Global Location Numbers (GLNs). These unique numbers replace plain language descriptions and they allow for the automatic processing of business messages and efficient data management.

## Logistics units

Every transport item can be identified with a unique serial number, the Serial Shipping Container Code (SSCC). This means that each logistics unit can be tracked as it is handled within the supply chain.

## Fixed assets

All company assets which need to be tracked individually can be given a unique serial number, the Global Individual Asset Identifier (GIAI). This means that an asset's lifetime history from acquisition, servicing and maintenance, sale, re-purchase, eventual disposal and recycling can be recorded unambiguously.



## Returnable assets

Returnable assets, typically returnable transport items, such as pallet bases, roll cages, dollies, totes, beer kegs and gas cylinders can be tracked either as an asset type or individually with a Global Returnable Asset Identifier (GRAI). This unique number enables the acquisition, use, maintenance and service, sale or disposal of an item to be recorded.

## Service relationships

Every service relationship with an individual can be identified with a Global Service Relation Number (GSRN). This number, which is only unique for each service provider, such as an employer, retailer, hospital and library, provides the means of recording personal information about each service relationship.

# Global data synchronisation



The identifiers of the GS1 System do not have any meaning. All the information about a particular product, company, location, logistics unit, asset or service relationship has to be provided by the organisation creating these identifiers and supplied to all their relevant trading partners.

The GS1 Global Data Synchronisation Network (GDSN) is an international network that enables all of the information that relates to products, companies and locations to be standardised and communicated quickly and accurately to all those companies that need this information.

Manufacturers provide all of their products' details (especially the GTINs that identify them) to a local electronic catalogue service. These electronic catalogues are called data pools and they use GS1 standards that define which information must be supplied about the products and the manufacturers. The products are also classified using GS1 rules so that users can search for a type of product without knowing who the manufacturer might be.

Data pools are being established for different markets and product types, but they will all be linked by the GS1 Global Registry which acts as a central information point. The Global Registry will direct users to the particular data pool which holds the information they are looking for.

The main benefit of the GS1 GDSN is that each manufacturer will only need to publish all the relevant information about their products once to a designated data pool. Each manufacturer's trading partners will then subscribe to receive this neutral master data from their chosen data pool. All the data is consistent, standardised and accurate.

Once trading partners have found each other by using the global registry and their preferred data pools, they can establish a private exchange of information about their own requirements. This information will typically include pricing information, minimum order quantities, trading terms and so on.

## The benefits of global data synchronisation are substantial

- all products, companies and locations are described accurately and consistently
- GS1 identifiers are used to minimise code conversion costs and errors
- errors in electronic messages are reduced significantly
- collaborative business processes are made much easier
- time to introduce new products is reduced by 80%
- incidence of items out of stock is reduced by 10%



# Bar codes and Radio Frequency Identification tags



All of the GS1 identifiers can be shown in standardised bar codes or RFID tags which cannot be confused with any other bar coding or tagging system.

There are bar codes that can be used throughout the supply chain and others that are designed for particular purposes such as the retail point of sale. The most adaptable bar code is UCC/EAN-128 which can be used to identify products, logistics units, assets, and locations, and represent extra information such as batch numbers and expiry dates.

Reduced space symbols can be used for very small healthcare items.

Data Matrix bar codes can be used for direct part marking of assets, and also for very small healthcare items.



GS1 bar codes are only ever used to represent Global Trade Item Numbers and are most often seen on items sold at the retail point of sale.

ITF-14 bar codes are used when printing directly onto corrugate packaging and are used when it is not necessary to provide extra traceability information about an item.

RFID tags can be used instead of bar codes when their extra functionality is of importance. The tags can be read further away than bar codes, can be hidden in high-value items and can be read automatically by some users' storage and shelving systems. They allow for even greater visibility of products in the supply chain and are being used alongside the GS1 bar codes. At present their much higher cost limits their use to products of particular value or importance, and are initially being used to track pallets and outer cases.

The data shown in these tags is called an Electronic Product Code (EPC) and it is in effect a GTIN plus a serial number for each product. Each pallet will be identified with an SSCC shown in the EPC. This means every instance of a product line will be identified uniquely.

# Electronic business messages



Today most companies are using computerised systems to manage their business operations. The data is often generated from other computer systems, either internally or from their trading partners.

If this data is saved into documents that are sent by mail or email to be re-keyed by the receiver, human errors will be introduced into this data exchange. Business messages such as orders, invoices, credit notes, despatch advices need to be processed as quickly and as accurately as possible, so the GS1 System provides standards for electronic business messages that can be created and processed automatically, without human involvement.



This way of exchanging business messages is known as electronic data interchange and it can be defined as the transfer of structured data using agreed message standards, from one computer application to another using an agreed communications channel, without human intervention.

GS1 has developed global standards for EDI that are based on rules developed by the United Nations Centre for Trade Facilitation and Electronic Business. These include EANCOM messages which are based on a set of rules called UN/EDIFACT (EDI for administration, commerce and transport), and XML (extensible markup language) based messages which have been designed following an approach developed by the World Wide Web Consortium.

Both of these types of message can be sent across the internet as well as by using conventional value added networks, and users will determine the best combination of message set and communications channel with their trading partners. These electronic messages are often sent and processed in real-time.

The EANCOM message set includes 49 different messages while there are six different XML schemas. (Schema is the term for the set of rules that defines a message when using XML.)

## The benefits of using these EDI electronic business messages include

- reduction in message processing costs of up to 80%
- faster and more accurate communications with trading partners
- ability to send and process business transactions much more frequently
- encouraging changes to more efficient business processes
- simpler processing with GS1 identifiers replacing in-house codes
- ability to exchange detailed information about supply chain performance automatically between trading partners



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# Global standards, local support



The GS1 System is a user-driven set of business standards that have been developed consistently since their introduction in 1973. The standards are maintained globally by GS1 which works closely with all of its national member organisations to ensure consistency in their implementation.

All users are supported in their use of these standards by their local national member organisation. In the UK this is GS1 UK which has over 17,500 members in all trade and industry sectors. As well as providing information and advice about implementation, GS1 UK acts as a forum for users to meet and contribute to the development of the standards.



All users can suggest improvements to the GS1 standards through the GS1 Global Standards Management Process (GSMP) which brings together technical experts, users and solution providers. The proposed changes are considered globally before being agreed and then publicised to all users.

# Working with solution providers



Working together to maximise benefits through the use of global supply chain standards

If you are a UK company involved in:

- consumer packaged goods
- foodservice
- healthcare
- logistics
- packaging
- retail

then working with a GS1 UK Solution Provider brings you the benefits of:

- maximised business efficiencies
- confident purchasing decisions
- supply chain standards
- peace of mind



## Why choose a GS1 UK solution provider?

In business, a strong working relationship between the customer and the supplier is critical to success. To help you work effectively with your supplier we have created the GS1 UK Solution Provider Programme. Membership of this programme is only for solution providers that offer products and services that support the use of GS1 global supply chain standards for:

- bar codes
- electronic business messaging
- global data synchronisation
- Radio Frequency Identification and the EPCglobal Network

All solution providers are also members of GS1 UK and have signed a Code of Practice, showing real commitment to providing excellent value and service to you, their customer.

## How to find your perfect partner

If you are looking for a solution provider then your first port of call should be the online Solution Provider Finder, found on the GS1 UK website – [www.gs1uk.org](http://www.gs1uk.org). The Finder is easy to use and you can quickly access the most comprehensive, useful and up-to-date directory of equipment and solution suppliers available.





### Setting the standard for quality

An additional feature of the Solution Provider Programme that brings benefit to you is the accreditation scheme. Designed by GS1 UK, this scheme helps you find solution providers with the acknowledged expertise to deliver products and services based on the GS1 System for bar coding.

An Accredited Solution Provider must be trained and assessed in all areas of the GS1 System and their business audited to ensure that this knowledge is fully embedded within their operations.

By choosing an Accredited Solution Provider you can be confident that they have the knowledge and processes to consistently implement first-rate solutions that are fully GS1 compliant.



To achieve accredited status a solution provider must:

- 1 Sign the GS1 UK Solution Provider Code of Practice, agreeing to a pre-determined level of professionalism, fairness, honesty and openness
- 2 Ensure that the required number of staff have attended and passed the GS1 UK Foundation Course – GS1 System
- 3 Ensure that at least one member of staff has attended and passed the GS1 UK Advanced Course – GS1 System
- 4 Complete a successful GS1 UK audit that certifies that knowledge of the GS1 System is embedded within their business

To find an Accredited Solution Provider simply go to the Solution Provider Finder at [www.gs1uk.org](http://www.gs1uk.org). Accredited Solution Providers are clearly highlighted and always appear at the top of search lists.





To find out more about how to use the GS1 System and how the various elements work together, please visit the GS1 UK website, [www.gs1uk.org.uk](http://www.gs1uk.org.uk)



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