



KEEPING GOODS IN MOTION



THE KEY TO CERTAINTY

**SAFE SECURE SUPPLY CHAIN TRACKING WITH
PRIVACY FOR ALL PARTICIPANTS**



Total Traceability - Everyone wants it, Codel and G-Log can deliver it!

If we examine the supply chain for a typical product, we can see that there are many involved parties from origin to destination (e.g. for a food product the flow would typically be from “Feed and Seed” to “Fork”).

Each of these parties has a role to play in the overall transaction, but has particular concerns regarding the product, data and value transferred between and with the other parties.



Why does Everyone want Traceability?

- Retailers want it to satisfy customer preference (GM non-GM), legal compliance, quality control, product recall, extend shelf life, product security, customer loyalty, Sarbanes-Oxley compliance, and corporate governance.
- Customers want it to be assured that the products they buy are safe (GM non-GM, BSE free etc.) They might want to register their purchases, file product guarantees & complaints, communicate their preferences, receive offers, and be able to prove ownership of assets easily.
- Manufacturers & brand owners want it to monitor sales, just-in-time, stock visibility, valuation, title control, product recall, feedstock tracking, quality control, anti-counterfeiting, communication with retailers and consumers, Sarbanes-Oxley compliance, and corporate governance.
- Carriers, distributors and logistics providers want it to improve their services and allow cooperative models for end-to-end supply chain solutions.

How can this Traceability be Delivered?

- The use of unique marking systems such as radio frequency tagging which can be remotely read.
- The use of Codel unique referencing nomenclature which provides 256 bit Unique Random Identifiers (URI's) for bar codes and RFID.
- The use of the Codel authentication system which stores only the digital fingerprint of the URI indexed against its time-stamped location.
- By linking Codel to existing supply chain logistics software such as G-Log's GC3 supply chain visibility and event management functionality.
- Using Codel and GC3 together to prevent the propagation of redundant or incorrect data.
- Using a Codel audit trail locked by a key that is widely published and which cannot be changed without detection.

How does Codel Work?

Codel is an authentication system that provides a security envelope around the unique references that are applied to products for tracking purposes, for example the Electronic Product Code (EPC) that has been specified by the Global Commerce Initiative (GCI). This security envelope is important because it protects the privacy of the data associated with a product, while at the same time allowing product location information to be shared between participants within the supply chain. In this way competing manufacturers, logistics companies, distributors and retailers can trace product from one end of the supply chain to the other, securely, even if there is a break in recording of location information. Codel is particularly useful for RFID tracking, allowing participants in the supply chain, including the consumer, complete control over what information they may choose to share with other users of the system. The system also resolves potential security problems around the unauthorised reading of data stored on RFID tags, for example using a reader to discover the exact contents of a secured vehicle.

Unique Random Identifiers (URIs)

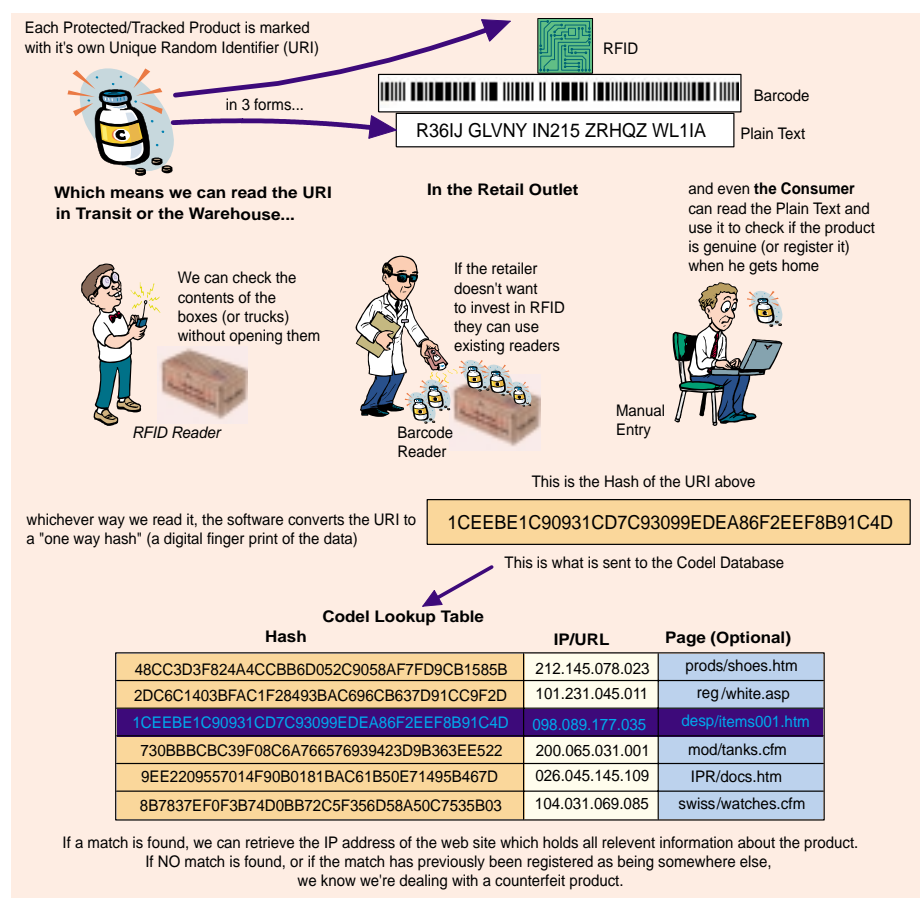
For barcodes or RFIDs, each Codel marked product will use one URI for its machine readable ID and a second unrelated plain text ID will typically be printed on the product for users to use over the web.

Use of the URI's enhances security in two ways. First, access to any given legitimate ID provides no clue to any other legitimate ID's (as is the case, for example, with sequential serial numbers, where once you have one traditional serial number, you can make reasonable guesses about other legitimate serial numbers before and after the one you have). Randomisation makes the counterfeiter's job much more difficult. Secondly, should a rogue reader access a random code, it gains no clue as to what product is carrying the code. This has major positive security implications for goods in transit, as only authenticated members of the supply chain have access to the lookup data which tells them what the RFID or Barcode belongs to. It also completely eliminates the threat to consumer privacy.

Codel achieves further security benefits by storing only one-way hashes of the unique random identifiers. As the hashing algorithms (SHA1, SHA256) are public domain, any data capture software in the supply chain can incorporate the algorithm and, at home, all web browsers can generate hashes from the plaintext identifiers entered by users registering or validating their products on the web.

How do Codel and GC3 work with GCI's new EPC protocols?

Codel and G-Log propose that Codel should be used as an alternative to some of the protocols that have been established by GCI which at present specify that most of the data should be held on the tag.



Problems with Data on Tags

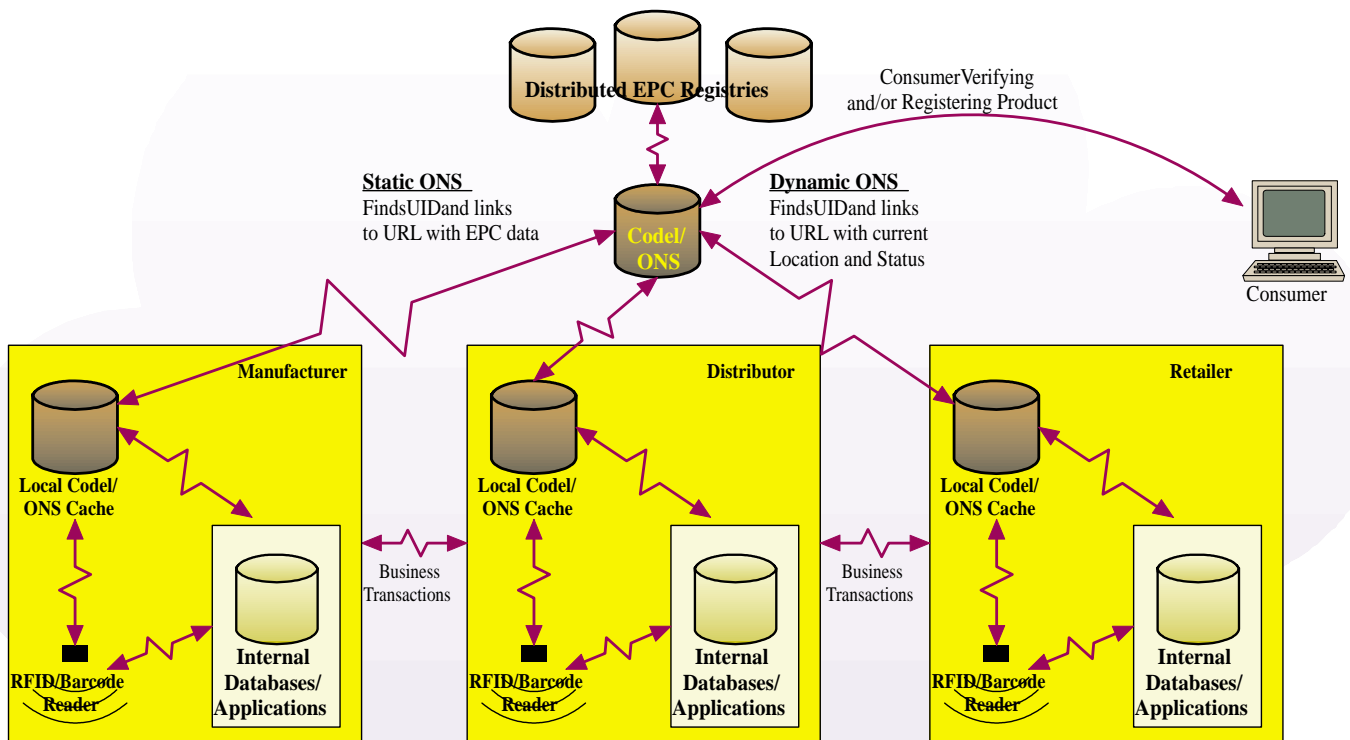
- There is a limit to the amount of data that can be held on the tag
- Tags that can hold a large amount of data are expensive
- Once data has been propagated to the tags, data integrity and reconciliation issues occur
- The data could be read by anyone with the correct reader and some of the data may be private
- Security cannot be added at a later date without re-programming all the readers that are in the supply chain
- Storing large amounts of data on the tag greatly complicates return procedures for items returned by customers/clients
- This mechanism does not provide for the eventuality where parties might want to share additional information between themselves such as product location.

- If the information is only held on the tag this does not give the user the ability to design handle and make use of the information

The alternatives are stark – either carry all the data for all parties on the tag itself or carry just an identifier that allows relevant data to be safely and securely interrogated and extracted from independently held databases. The latter option is the logical choice and Codel provides a unique key traceable to the item, while the data itself remains distributed amongst the parties and under their control:

G-Log/Codel partnership

G-log's GC3 transportation solution that provides a single, integrated technology platform for planning, executing, and managing the movement of goods across the supply chain, has been brought together with The Ascent Group's new authentication system, Codel, to provide secure, end-to-end traceability across the supply chain. G-log are the first logistics software application provider to recognise the way that Codel leverages existing logistics applications by providing them with a unique referencing nomenclature that



Schematic showing How Codel Takes the place of the Object Name Server in the EPC guidelines to provide identical services with Codel enhanced Security & Privacy

can be used across all supply chain and logistics software applications. Codel and GC3 together can offer substantial benefits for all participants within the supply chain but particularly to retailers who need to reduce costs and provide a simpler more cost effective service to their customers.

For applications such as GC3, which manage the execution of transport and logistics services throughout the supply chain, this approach offers a number of potential benefits. These range from the pure authentication of data received, through to being the key to giving access to detailed information about a single item in the supply chain.

GC3 with Codel gives the user the ability to sort useful information from all the proliferation of data that will occur with the introduction of RFID tagging!

An example of Codel and GC3 together

- Using the unique key issued and recorded on each transport handling unit of product, a carrier may confirm that items have been delivered.
- The transportation application may use this key to validate that the product is the correct product that was originally shipped and provide this data back to the shipper as proof of delivery.
- This enhances security so that the shipper can know his product, as uniquely identified, has arrived at the destination and not that just "so many boxes" have been delivered.
- The retailer can enquire on GC3 to find out which carriers moved a specific case of the product.
- The manufacturer's batch number can be accessed using the key and the details of ingredients, quality testing, etc, may be investigated.
- The manufacturer can trace from his batch number to the receipt of ingredients within his own production systems as well as through carriers and warehouses to the producer.
- The manufacturer can access the producer's quality data and so on back to the farmer (assuming it to be a food product) who will have his record of the seed supplied and the fertiliser used for each square metre of the field.

GC3 can similarly store the relevant keys with each transport event in the supply chain to provide a complete audit at individual package level. Additional data may be stored with each event – such as temperature or quality – and be made available to control exceptions.

Because GC3 is managing and storing data about all the activities within the supply chain, it is uniquely positioned to provide visibility of inventory and status. By using the key to provide the link to relevant data sources, a complete audit of a product can be accessed.

Codel and GC3 are products offered in partnership by G-log Ltd and The Ascent Group Ltd. For more information please contact:



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