MASS SCALE PRODUCT DIGITIZATION WITH NEXT GENERATION WEB-ENABLED GS1 CODES

Trillions of barcodes on consumer products around the world are set to change thanks to a new product coding standard called the GS1 Digital Link. It sounds simple, but its impact will transform the entire consumer product industry. It allows every physical product to be enhanced with an intelligent digital profile in the cloud which is linked to a single code on the label or packaging. This means products can connect to the web through their standard GS1 identifiers and brands can deliver a raft of new applications from direct-to-consumer digital services to supply chain traceability. Read on to learn how you can apply this new generation of codes for mass scale product digitization.
Executive Summary

Over four trillion consumer products are manufactured and sold each year around the world, each one with a standard GS1 barcode. Now a new generation of internet-ready GS1 identifiers has arrived that will take packaging codes beyond supply chain and point of sale and enable direct consumer interaction.

GS1 Digital Link
This new standard, launched July 2018, makes product digitization possible at massive scale. It allows physical products to connect to the web using an intelligent product identity in the cloud. With the GS1 Digital Link, products can be scanned at point of sale and by consumer smartphone, and they can deliver a host of new digital applications thanks to their web-connectivity.

What does product digitization mean?
Digital transformation is being adopted across the consumer product industry. Data analytics and ecommerce are changing business models and enabling new efficiencies in business processes. But the physical products that manufacturers, brands and retailers make and sell have so far played a limited role.

The physical product is the most critical asset
Your products touch every part of the business process and every consumer. Digitization makes it possible to gather data from and about these physical products as they move through the supply chain from manufacture, to distribution, to retail and into the hands of the consumer.

Digitized products provide a direct channel for connecting brands with consumers to gather first-party data as well as deliver new content and services. At the same time, they help reduce inefficiency in the supply chain with real-time data and visibility.

Product digitization is the most powerful and scalable foundation for digital transformation.

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The value of digitized products

**High Engagement**
Consumers scanning products result in 10 x more engagements than from paid digital ads

**Better Engagement**
23% longer dwell time from product-generated contact, with 39% more Likes & Shares.¹

**Operational Visibility**
End-to-end traceability analysis is “at least 40 times faster”²

**Boost Integrity**
Immediate counterfeit or gray market detection using data analytics and machine learning

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¹ Source: Consolidated results from EVRYTHNG customer deployments.
² Source: The Glenmorangie Company
The big digital ‘switch-on’ has started

The GS1 Digital Link means all products can be internet-enabled

Over 5 billion barcodes are scanned daily around the world – that’s more transactions than there are Google searches every day. The new ‘GS1 Digital Link’ upgrades this 40+ year-old technology for a connected world.

Let us look at how it works. Each code contains a GTIN that identifies the Product SKU, optional unique identifier and most importantly, a URL that links to the product’s digital identity on the web. Linking the unique symbology on the product with an intelligent digital identity in the cloud means that consumers can get dynamic access to product provenance and other product information, brand content and digital services when they scan the item.

And, because it is a GS1 standard, point of sale systems and supply chain readers can identify the product via the same code too. Furthermore, it means that all kinds of apps can understand what the product is and use this information (e.g., an allergy information app, a fitness tracking app, etc.)

On top of this, brands can add data intelligence to every product to tackle challenges that physical product packaging just cannot deal with by itself, such as complex regulatory requirements, real-time tracking for supply chain integrity or authentication to detect counterfeits.
Billions of the world’s smartphones and consumers are ready

There is an enormous audience of consumer and end users now that every smartphone is a tool for interaction and transaction with every product. 2 billion iOS and most Android consumer smartphones around the world today can natively scan QR codes and interact with NFC tags without the need for special apps. The phone’s camera automatically recognizes the 2D code and opens the web address for the product to launch an interactive digital experience or service, determined by the product’s digital identity in the cloud. Similarly iPhone and Android smartphones can tap an NFC tag on a product and access the same web address for the product, a frictionless alternative for higher value products.

Scanning codes is a way of life. QR code scanning increased by 32% in the US last year\(^2\), and there over 8 million snapcodes scanned every day. In China, 100 million QR codes are scanned every day on product packaging, tickets and in-store displays, with mobile payments via QR codes reaching $5.5 trillion in 2016\(^4\). This trend has led to the major internet providers getting in on the act, with the like of Amazon (smile codes), Facebook and Spotify all pushing their own proprietary codes to drive consumer engagement.

Making the most of your packaging space and the end of proprietary codes

It has become increasingly challenging to fit more and more information and special purpose codes onto product labels. Marketers want to add digital triggers for augmented reality experiences and campaigns. Regulators require product provenance information to be both printed and to be digitally accessible. And brand protection and compliance requires other coding for authentication. Creating and printing all these different tags is expensive, with physical space on products limited. It is hard too for consumers to find information with so much crammed onto the product.

The GS1 Digital Link solves these problems, making it possible for one code to be printed onto a product with global economies of scale and efficiency in space utilization on the product.

We will see an end to the proliferation of multiple codes on pack. No more 1D barcodes just for legacy supply chain apps. 2D barcodes will serve all purposes, and in time when POS and supply chain apps have been updated to support them, they are expected to be the default code of choice, and extend the reach of GS1 standards to the consumer.

\(^2\) Statista.com

\(^4\) The Economist
Enabling applications through the product lifecycle

From manufacture through to recycling, brand owners can provide many new digital services to enhance their product offering through a single code, combined with intelligent digital identity in the cloud.
The 4 stages to web-enable your products with EVRYTHNG

1. Digital Identities
Create digital identities in the EVRYTHNG platform via our self-serve tools, and import your GS1 identifiers.

- GTIN, SKU level or serialized (item-level), maps to a corresponding digital identity, with QR code and unique url.
- Serialized Identities can be mass-generated.
- Connect to enterprise systems to build out detailed product profiles and attributes.

2. Packaging & Printing
Print product packaging and labels with required code or tag: either QR code, Datamatrix or NFC tag, or a combination.

- EVRYTHNG integrate with an ecosystem of global packaging companies who now support the GS1 Digital Link and print on-pack codes with embedded digital identities at source.
- 1D barcodes will be phased out from packaging as POS systems are upgraded to support this new GS1 standard.
3. Create Consumer Experience

Build your web or native app experience, using our mobile developer tools. Decide what product information or brand content is given to users who scan the QR code on pack.

Enhance with dynamic rules to offer different content or experience based on context like geolocation, user profile or the time and date using EVRYTHNG’s patented IoT Redirector technology. For example, the same QR code can deliver different campaigns based on customer profiles.

4. Brand Integrity and Consumer Insights

Collect and leverage all the data generated to help boost brand integrity and fuel your CRM initiatives.

Use our customizable dashboards to report on success metrics, such as consumer registrations or total engagement. Export data into 3rd party BI tools or use our Advanced Analytics and Machine Learning tools to identify gray market or counterfeit activity.

Digitize your products now
Get started for free at: https://dashboard.evrythng.com/signup
Implementation on products

An Implementation with QR code for a beverage product
The GS1 Digital Link can be written in any type of 2D code. However, using QR codes is our suggested implementation as they offer the most support by modern mobile phone platforms namely, iOS or Android.

This full-bodied India Pale Ale is loaded with fresh hops for a powerful blend of citrus, pine and fruit aromas. The firm malt backbone works well with the bold hop finish that everyone expects from an IPA.

Implementation with QR + NFC for an apparel product
Different tags containing a GS1 Digital Link can also be combined to allow maximum support. For instance a QR code can be printed on a NFC tag to ensure a large majority of consumers can utilize the GS1 Digital Link, even those without a NFC capable phone.
Technical overview

GS1 Web URI Structure

The standard underlying the GS1 Digital Link is the “GS1 Web URI Structure” standard. It was introduced because until now there has been no standard way for consumers to interface with GS1 identifiers. It enables every single product to get a unique and resolvable identity on the web. It provides a unique and standard way of converting GS1 identifiers, also known as GS1 Application Identifiers or AI, into a web address that can be understood by the majority of mobile platforms and applications. Finally, it can be used on the web, describing products and items in a language that web crawlers and other applications can read.

The structure of a GS1 Digital Link is as follows:

```
https://{domain}/{identifierKey}/{value}/({keyQualifier}/{value})*?{dataAttribute}={value})*
```

| ()* | Repeat this section several times with different key value pairs |
| identifierKey | GS1 Identifier Keys, e.g., GTIN, SSCC, GLN as string or numeric identifier |
| keyQualifier | GS1 Key Qualifiers, e.g., CPV, batch, serial as string or numeric identifier |
| value | GS1 compliant identifier value, leading 0 removed, e.g., for a GTIN: 9507000009060 data |
| dataAttribute | GS1 data attributes as numeric identifiers, e.g., for Best Before Date: 15=220420. This space is also available for any (non GS1) extension as query parameters, e.g., sec=12iu7 for a platform specific security parameter |

As an example, the following web address is a URI representation of a serialized GTIN in the numeric short form:

```
https://dfnnr.tn.gg/01/860080001300/22/323/21/445?15=220131&sec=12iu7
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Or in its more developer friendly (but longer) alphabetic form:

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The protocol (i.e. secure HTTP) A domain chosen by the brand or service provider The GTIN (identifying a product) The product variant The serial number (identifying an item or thing) The expiration date An optional non GS1 standard parameter to pass to the application, here used as a security marker, for example to help prevent counterfeiting
Resolving GS1 Digital Links

In most cases, a mobile device will resolve the URL (e.g., in a browser) and redirect the consumer to brand or product content. Importantly, this redirection can be dynamic and based on context rules rather than static. For instance, using EVRYTHNG’s powerful patented IoT Redirector.

A Digital Link does not always need to be resolved on the web. For instance, it will be understood both by POS readers or other readers in the supply chain and by consumer mobile devices.

*Key point:* A POS system does not need to actually resolve the URL on the web but can extract the GTIN and serial number by parsing the URL offline.

Similarly, an application (e.g., an allergy application) may choose not to resolve the URL but instead extract all the contained information to get allergy information for the product.

Digital Links and the Semantic Web

GS1 Digital Links have one more powerful use: they can be used as unique identifiers for the semantic web. This allows you to create authoritative links to a product from another page (e.g., a review page). Furthermore, it is possible to describe relationships to a ‘Digital Link identified product’ using machine-readable Linked Data. As a concrete example, a web page with a cleaning manual for a pair of hiking shoes can reference the shoes in a machine-readable way i.e., explaining to applications that this page is about these particular hiking shoes. This is very useful to allow the automatic discovery all kinds of relevant content around a product on the web.

https://id.gs1.org_gtin/09507000009060_ser/00107
### Managing your product data in the cloud

**Introduction to the EVRYTHNG Platform**
EVRYTHNG is the first platform globally to generate GS1 Digital Links at scale. We manage billions of unique digital identities for many global brands today, giving each physical item an Active Digital Identity™, mapped to a GS1 Digital Link, which connects it to the web. The core building blocks of the platform are shown below.

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**Active Digital Identity™**
An intelligent digital twin for every product with its own unique Digital Link which allows it to interact on the Internet and generate data. EVRYTHNG ADIs also support multiple identifiers pointing to the same digital twin allowing for interoperability between different codes, such as NFC, RFID, DataMatrix and QR.

**Semantic Data Models**
A flexible and dynamic way to capture all your products’ attributes, using GS1 vocabularies (including support for GS1 Smart Search and GS1 EPCIS), so that any aspect of its profile is accessible over the web, and can participate in applications.

**Machine Learning and Analytics**
Data visualization and advanced algorithms can be applied to product and consumer datasets to unlock actionable insights.

**Blockchain Integrated**
Replicate product data and events on relevant blockchains out of the box for verification and transparency.

**Reactor Rules Engine**
A customizable and real-time scripting tool which allows you to automate workflows and alerts based on real-world actions and events.

**Dynamic Scans**
A patented URL redirection tool to define the web service the user’s device is routed to, according to dynamic and context-specific parameters, like user profile, location, or day.

**Integrations**
Your product can interact with the wider digital ecosystem via standardized integrations to enterprise systems like Salesforce or SAP, or consumer platforms like Facebook or Amazon Alexa.

**Security**
Each product URI has a unique crypto secure key and communication is protected by strong web protocols (TLS). Product data and services are strictly controlled by granular and flexible permissions for consumers, retailers or logistics partners.
About EVRYTHNG

Activate the billions of things that move your business

Now individual product items can communicate with your business and your customers. EVRYTHNG is the market leading internet of things SaaS platform for consumer products, providing billions of trusted digital identities with real-time intelligence through the supply chain and to the consumer.

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<th>PRODUCT SUITE</th>
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<tr>
<td><strong>ACTIVATE</strong></td>
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<tr>
<td>Provide trusted product identities and product information for your enterprise applications</td>
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<td>For consumer product brands who need to connect consumer products to the digital ecosystem and share their trusted data with any enterprise or consumer application, ACTIVATE provides a suite of tools which enable this digitization at massive scale. Through cloud-based product identity and data management, companies can rapidly provision and deploy crypto-secure, serialized digital identities, with optional GS1 Digital Link, and connect products to the supply chain and to consumers through the lifecycle.</td>
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| **AUTHENTICATE** |
| Protect your brand, your revenues and your consumers |
| For premium brands in apparel and CPG who want to restore consumer trust and recover lost earnings from counterfeit and parallel trade activity, AUTHENTICATE provides a new level of traceability and detection. Through a combination of unique digital identities, crowd-sourced consumer engagement data and cloud-based machine learning and analytics, AUTHENTICATE gives visibility and control over the supply chain with a cohesive view of each product’s journey from manufacture through to post-purchase. |

| **AMPLIFY** |
| Build direct to consumer relationships to grow consumer trust, loyalty and revenues |
| For consumer product brands who want to keep a continuous dialogue with their consumers and keep them engaged and coming back for more, AMPLIFY transforms physical products into millions of data-driven and brand-owned, interactive consumer touchpoints. Customers scan products in-store and post purchase, with each scan providing brands a direct engagement opportunity generating valuable first party data. |

To get started, see a demo or find out how product digitization can transform your business visit [www.evrythng.com](http://www.evrythng.com) or email us at [hello@evrythng.com](mailto:hello@evrythng.com)