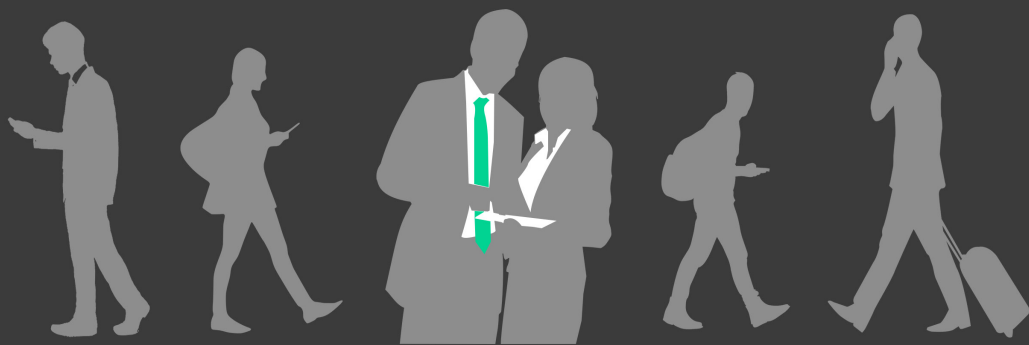




the **INTERNET** of **PRODUCTS**

Decoding the larger world of
pseudo-connected internet of things.

By Qliktag Software Inc.



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www.qliktag.com

The Internet of Products

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First Edition

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THE **INTERNET** OF **PRODUCTS**

by Qliktag Software Inc.

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INTRODUCTION

A Fundamental Shift is Happening Right Now.

Every once in a while, we encounter a phenomenon that doesn't just create a stir but causes a fundamental shift in the landscape and alters the course. In order to understand this, let's look into some examples of technology shifts in the recent past.

In 1991 the World Wide Web was born. Prior to 1995, only a few early adopters launched websites or digital representations of their organizations and brands. IBM, Microsoft, Pizza Hut and MTV were among the early ones to go on to the web. In time, nearly every business organization and brand followed suit and today it's almost unthinkable for an organization not to have a web presence. The mid to late 90's can be seen as the Internet of brands and organizations.

“The website was effectively a digital representation of the organization or brand on the internet & this opened a world of possibilities in commerce.”

In the early 2000's a completely new phenomenon started taking shape. Instant messaging websites and social networking sites started to appear. AOL Instant Messenger, MySpace, and Blog.com marked the start of this new era during which “People” would create a digital representation of their identity on the Internet. This was initially in the form of a user profile with a photo, a personal page or web profile which would represent them on the Internet and enable them to interact and carry out social interactions. It started with a few people, often celebrities having a representation on the web and within a few years when social media took off, it's nearly unheard of for a person not to have a profile or presence on the internet.

“Social media is essentially the Internet of People where every person has a digital representation or identity on the internet. That in itself enables a world of possibilities for people to interact with one another share, communicate & collaborate.”

Fast forward to the present day and the phenomenon of the Internet of Things or IoT is taking shape. “Things” or devices are connecting to the Internet and sending/receiving data opening new possibilities and causing a shift in the way we live. Wearable fitness devices, household appliances, houses, cars, bathroom mirrors and everyday things are connecting to the web enabling new applications.

“The Internet of Things is characterized by the ability of interconnected objects or devices to connect to the internet and send or receive data”

All of these advances created a fundamental shift, which changed the course of business, society and even how we interact with inanimate objects or how they can interoperate with other things.

This brings us to the next phenomenon that we are starting to see unfold right now in a significant way – one of the products going on the Internet. The “*Internet of Products*” we believe is one of those fundamental shifts in the landscape that will impact retail, commerce, consumer transparency, the way we make purchases and way we interact with the consumer products both pre-purchase and post-purchase. The Internet of products is starting to take shape here and now.



INTERNET OF PRODUCTS

The Internet of Products. What it is Not?

The first thought which comes to mind while encountering the term “Internet of Products” is “well, of course, I’ve heard of products going on the Internet! There are products all over the Internet. I’ve shopped on Amazon, eBay and shopped online. Isn’t it the same as e-commerce?”.

To grasp the idea of the “Internet of Products”, before we get into what it is, we’ll need to first dispel the notion of IoP and E-commerce being the same thing. E-commerce or online shopping is an application of IoP or a consequence of products being converted to a digital/information form and going on the Internet. It is not synonymous with IoP.

It is also not synonymous with IoT or the Internet of Things in that with IoT, “things” or devices have the inherent built-in capability to connect to the internet in order to send or receive data. IoT includes things or objects that can directly connect to the internet using Wi-Fi, Bluetooth or some direct connectivity technology.

The assumption here is common consumer products like apples, a pair of shoes, a baseball bat or a bottle of ketchup are not fitted with connectivity technology and cannot directly connect to the Internet in order to send and receive data. That established the concept of IoP is not the same as IoT.

The Internet of Products. What is it?

When a ‘physical product’ is converted into its digital representation, data record or ‘information form’ on the Internet and this “virtual representation” of the product can be written to, read from, sent or received over the internet, that physical product effectively has a digital instance of itself accessible on the internet.

And this simple concept is a powerful one.

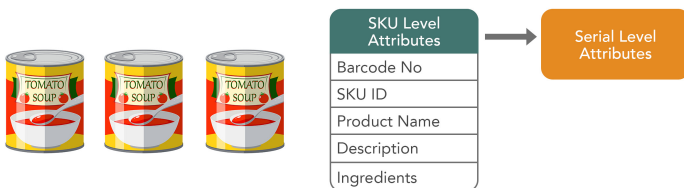
A concept that opens up a world of possibilities, powerful applications and changes the way we perceive the world of retail and products.



In the real world, this bottle of pasta sauce is a physical product and can be seen, felt and picked up in a way we're all familiar with. In the information world or on the Internet, this bottle of pasta is effectively represented by a series of data attributes about the product. – attributes like the products name, the quantity, images of the product, a description, its ingredients, nutrition information, instructions, warnings, date of manufacture and more. These attributes associated with the product are structured and form the data model and instances of this collective group of attributes now represent the actual bottle of pasta sauce on the Internet.

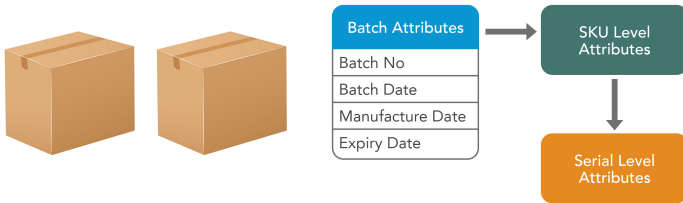
This digital representation or record of the pasta sauce can be maintained at:

1. SKU Level



A single record is maintained to represent each stock keeping unit or variant of the pasta sauce and store attributes relevant at this level. Barcode number, manufactured by, images, ingredients, product warnings, and certifications are attributes commonly associated at an SKU level.

2. Batch Level



A single record is maintained for an entire batch of sauce manufactured and bottled at the same time, a case of bottles or a larger shipment depending on the number of units the record represents. Date of manufacture, batch number, and expiry date are commonly associated with batch level attributes of a product.

3. A Serial Level or Individual Unit Level



Serial Level Attributes	
Serial No	
Owner Name	
Sold By	
Location	

A single record is maintained to represent each individual serial item and carries attributes specific to the serial instance of that product. The serial number, product ownership history, date of purchase and item location are commonly associated with an individual instance of a product.

These digital instances of pseudo connected “things” on the internet or digital representations of real-world products make up what we call the “Internet of Products” also referred to as IoP in this e-book from here on out.



The Information Drives Our Actions

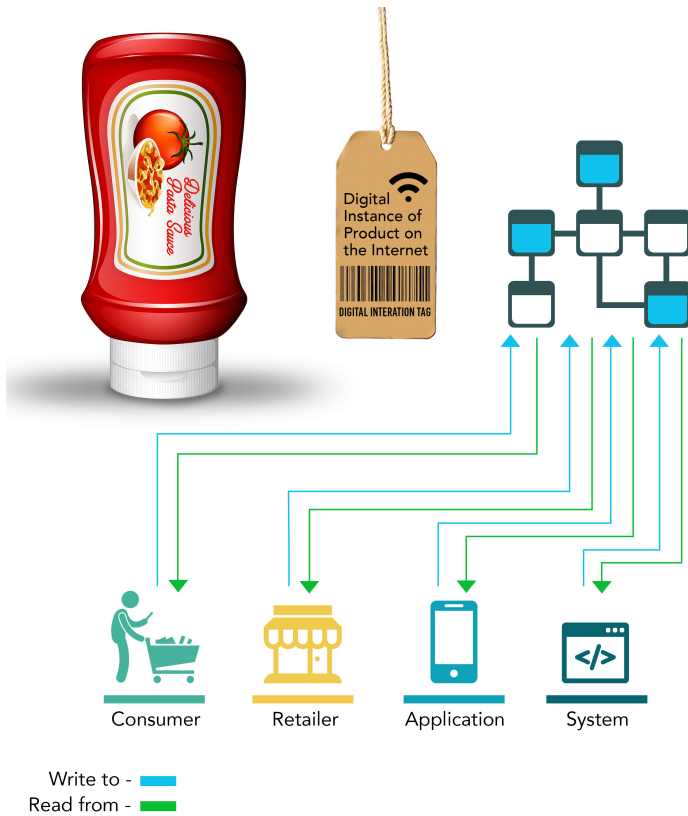
The digital representation or information about a product isn't a new concept. In fact, it already drives most of our purchase decisions today. Think about the last time you purchased a product online – a laptop, for example. In all probability, the laptop was possibly miles away from where you made the decision to purchase it. You did your research online, captured attributes about the laptop such as the brand name, images, how it looks, what powers it, the screen dimensions, battery life information, product reviews by others, professional reviews, video testimonials, feature comparison charts, price comparison charts and all the information you could instantly access. You then processed that information and completed your purchase almost entirely based on an information representation of an actual product without being physically present in front of that product.

It's not just purchased decisions driven by the digital representation of products on the web. Logistics, stock keeping, shelf planning, marketing and a whole lot of other functions depend on product attributes and data today.

What is new and changing, however, is being able to use this concept of virtualizing a physical product on the internet at a SKU, batch, or serial level, making it accessible over the internet and building innovative applications that can read or receive data from this digital instance or send and write data back to this digital instance without the actual product having to connect directly to the internet.

By actually maintaining an authoritative, singular digital record and data representing a non-connected physical product, the possibilities of the Internet of Products unfold. The digital representation can be accessed or written to using external devices like mobile phones that are capable of connecting to the Internet themselves rather than the actual product directly connecting to the Internet.

THE INTERNET OF PRODUCTS



With the ability to write to or read from a digital instance of the product, an interactive online experience for each product can be created and numerous applications enabled allowing different stakeholders to interact with these digital instances of products that have a counterpart in the real world.

Everyday Shirts on the Internet of Products.

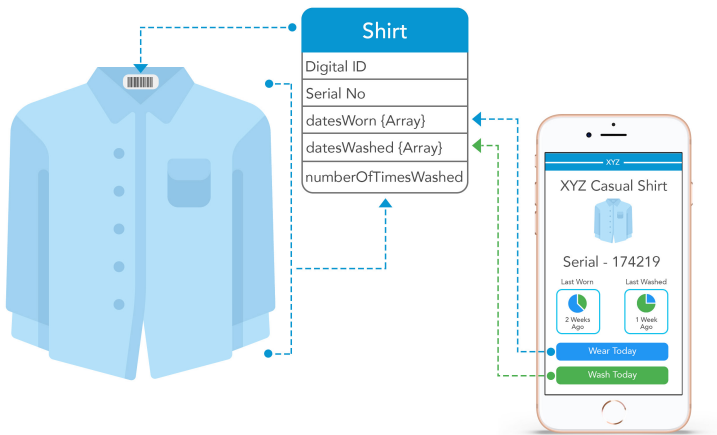
Let's consider an everyday product like a shirt, for example. If my shirt had a digital representation on the web I would assume it would contain attributes like an identifier, the date of purchase, the color, the place of manufacture, the size, and attributes that represent the shirt. However, what if I'd like to use the IoP concept to track how many times I've washed the shirt or the dates I have worn it on?

We could modify the data model of the "Shirt" to include attributes such as 'datesWorn', 'datesWashed' and 'numberOfTimesWashed' among others. Upon creating a "Thing" to represent the shirt, the Internet of Products system would create a Unique Digital ID for that shirt.

Secondly, we would attach the operations 'Wear' and 'Wash' to the shirt. Next, we would construct a Digital Interaction as a view into the shirt. That Interaction would manifest itself as a mobile page representing the shirt that would display the attributes of the shirt including dates the shirt was worn, washed and the total times it had been washed.

The Interaction would also have buttons representing the Wash and Wear operations. Finally, we would print a QR code, barcode or an activation trigger on a washable label pointing to the Digital Interaction we created of the shirt that we would sew on to the shirt.

Now each time before we washed or wore the shirt we would scan the washable label with any QR reader on our phone and click on the Wear or Wash button. The Digital Interaction would also show us the last time we washed or wore the shirt.



Imagine a brand of shirts providing this capability for all their shirts enabling consumers to easily keep of how often a consumer wore or washed their clothes. Now imagine the data the brand would get allowing it to better understand their consumers' behaviors. That's quite a powerful concept, to say the least.

It is time to start thinking of Internet of Products as a world of virtual representations of real-world products made up of product content and data accessible via the Internet. Once you do, it opens up a world of additional possibilities.

Let's take a look at some use cases where the underlying concepts of IoP have played a role in solving business challenges or creating innovative applications that have real-world relevance.



HOW HP TACKLES THE COUNTERFEITING MENACE WITH INNOVATION

The Challenge

Counterfeiting is a major concern for brands. Companies lose billions of dollars in revenue and consumers also suffer the consequences in situations where they are unable to verify the authenticity or their ownership of products. The Organization for Economic Co-operation and Development (OECD) estimates the annual value of international trade in all counterfeit goods at US\$200 billion.

The Response

Imports of counterfeit and pirated goods are worth nearly half a trillion dollars a year or around 2.5% of global imports, with US, Italian and French brands hit the hardest and many of the proceeds going to organized crime, according to a new report by the OECD and the EU's Intellectual Property Office.

HP introduced a four-step method to easily authenticate products such as ink and toners. To authenticate whether a product is a genuine HP product, customers can use their smartphones and scan the QR code placed on the HP Security Label on the packaging.

The QR code redirects to an online verification site checking the authentication number on the label against its online database which maintains records of the product down to the serial level. If the IDs match the user is informed they have purchased a genuine HP registered product or offered a way to report a counterfeit in case the authentication fails. HP's Tamper Evident Label and Security Label initiatives are a step towards enhancing its brand protection that customers can rely on.

By providing its customers with easy to use, online and mobile validation processes, HP can ensure the sale of authentic products. HP is continuously working towards providing secure business solutions to its customers. HP anti-counterfeit is a great example of how brands are employing technical innovations based on the concept of 'Internet of Products'.

“Counterfeit HP cartridges are predominantly refilled or remanufactured print cartridges packed in unauthorized or fake reproductions of HP packaging, that can’t compare to genuine HP cartridges. At HP, we are constantly striving to protect you from counterfeiters with new security measures.”



Image courtesy: <http://www8.hp.com/us/en/cartridge/anti-counterfeit.html>

The IoP Connection

Being able to maintain a digital record of a product on an individual serial level enables HP customers to scan the physical counterpart of the product, pick the authentication code off the label and use the internet to run a check against the digital record. This creates an authentication method which is tougher for counterfeiters to replicate. Easing the product verification process and enabling customers to authenticate products via mobile devices, HP has successfully managed to deter fake products in the market and further strengthen its brand security/image.



HOW COOP'S SUPERMARKET OF THE FUTURE PROMOTES BETTER INFORMED CONSUMPTION HABITS

The Challenge

As consumers are rapidly becoming more conscious of what they put into their bodies, what they consume and base their choices on the availability of more information, retailers have often struggled to keep up with this increasing demand to supply that information to consumers where they need it the most. Brick and mortar retailers are innovating to stay relevant in the market. Supermarkets are constantly looking for technology in order to enrich the in-store customer experience. One such commendable and innovative initiative is the Supermarket of the Future by COOP Italia in collaboration with Accenture, Avanade, Intel, and Microsoft.

The Response

The Supermarket of the Future is a large grocery store featuring pioneering digital solutions developed by Carlo Ratti Associati and built by Coop Italia, Italy's largest supermarket chain in collaboration with Accenture, Avanade, and Microsoft. The store explores how data can be used to promote more informed and more sustainable consumption patterns through the use of technology.

It utilizes facilities such as interactive food tables, smart shelves and real-time data visualizations to inform shoppers about the origins and characteristics of particular food items, promoting more informed consumption habits. The shelves are equipped with Kinect movement/motion sensors from Microsoft's Xbox Kinect gaming console. When a consumer picks up an item off the shelf, the action triggers a display placed in front of the consumer which then shows the user more detailed product information such as the ingredients, nutrition facts, place of origin and more. Consumers can then instantly get insights into the product they picked up and make informed choices. Through these "seamless augmented tables", brands have the opportunity to convey detailed product content and be more transparent to end consumers.

Such innovative technology-enabled representation of products on digital shelves at the point of purchase makes the shopping experience more interactive and transparent. It is a great opportunity for brands to refine, enrich and elaborate their product data in order to display complete information to consumers.



The IoP Connection

In order to combine the physical product experience with the digital/information driven experience of the product seamlessly, this innovative solution uses the Kinect motion sensors to identify the product. Once identified, the technology uses the identifier to fetch a digital/information of that product on the SKU level and present that digital representation in an attractive visual format that's easy to consume. A representation which is essentially a collection of attributes of the product SKU being picked up but used to create an experience in store. The Supermarket of the Future uses technology to help products tell their story better, inform consumers it integrates the Internet of Products concepts to perfectly illustrate the possibilities that lie ahead.



**HOW BARILLA'S
FOOD TO FORK
TRACEABILITY GIVES
EVERY PRODUCT A
DIGITAL PASSPORT**

The Challenge

Today's consumers are not only health cautious but are also knowledge seekers when it comes to their food. They want to know exactly where their food comes from. Consumers care about where their food comes from, how sustainable it is, and how it reached them among other things. This helps them in making better purchasing decisions. On the business side, traceability is just as important. Knowing the exact origins of every ingredient or component of a product, being able to track every movement of every component of the product across the supply chain and beyond can have big implications. The challenge of product recalls both for food retail as well as non-food sectors costs companies millions of dollars every year and often involves shutting down the entire supply chain or branch of the supply chain to trace back a defect or source of quality issues.

But what if you could trace back to a very specific source and only cut suspend supply from that one farm or one supplier? The underlying IoP concept is playing a major role in this process and leading pasta brand Barilla has a great example of food traceability.

“According to the Grocery Manufacturers Association in the U.S., the financial impact of a recall is quite significant: 52% of all recalls cost over \$10M and 23% cost over \$30M.”

The Response

When it comes to food chain supply, tracking everything that happens downstream is key. What if you could pick up a product and actually look up the journey and path it took right from its earliest stages all the way up to you right now? Thanks to the core underlying concepts of the Internet of Products, this can be done by creating digital records of the products and assign values or activities to them at each point. Italian pasta company, Barilla launched a big initiative called “Farm to Fork” which uses digital labels activated by QR codes on their products to provide customers with a view into the journey a product took right from the farm to their plate. Customers can scan the package’s QR Code to learn exactly where, when and how each ingredient was procured.

They can also scan the package to see the exact farm to plant to store supply logistics. In order to achieve this, Barilla assigned a “Digital Passport” to every product or a traceability log accessible on the internet. As the actual source ingredients like the wheat moved from the farm it was grown on to the storage facility and onwards, the location and activity performed would be stamped or recorded on this Digital Passport so that when users finally scan the QR code on that product, they can trace back the journey and these points that were logged onto that Digital Passport hosted on the internet.

As part of Barilla's Safety for Food initiative, the IoP and the data being logged against each product is helping the company fight against food counterfeiting while elevating food safety practices and Barilla's brand image.



Image courtesy: <http://scoprilafiliera.sugobasilico.barilla.it/>

The IoP Connection

The IoP enables maintaining activity logs or transaction logs at a product level or individual instance level for every package or product offline. This allows activities, locations, and other events to be logged or recorded against a product much like a stamp in a passport. The same information log can then also be made available to consumers with a product trigger like a QR code in Barilla's case in order to empower them with knowledge about how and where exactly their food product comes from. These very same concepts can enable numerous traceability applications whether it's tracking the location of items, delivery schedules, ingredient sources, ownership history, usage history and more.

The Internet of Products will have a large impact on traceability and the data it generates in the process will have further benefits in the form of data analytics and business insights.



HOW BULGARI OFFERS DIGITAL WARRANTY ACTIVATION ON TIMEPIECES

The Challenge

Warranty management forms the most tangible part of post sales services. Companies incur considerable costs in ensuring the warranty services are effective in keeping customers happy, however, the process of activating warranties and managing them has largely remained unchanged. The product typically comes with a paper warranty document enclosed. This needs to be filled out by the customer with their name, place of purchase date, their location or address and then has to be signed and submitted by the retailer before it goes into effect.

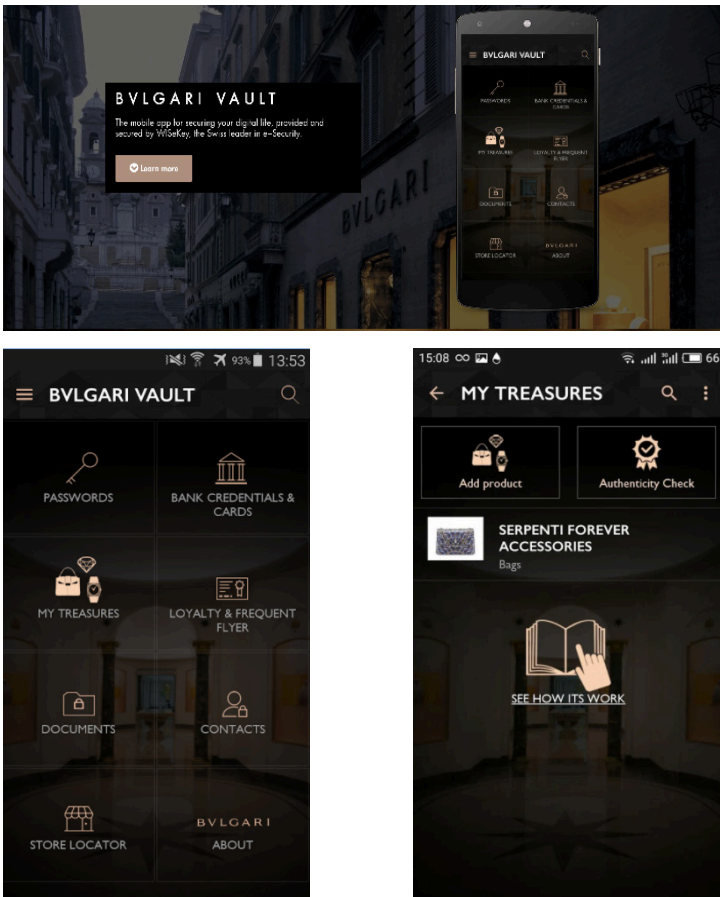
Claiming a warranty has typically required carrying a warranty card document around and physically presenting it at a location where it can be claimed. That location is often restricted owing to the limitations of the warranty system. Luxury brand Bulgari is among a growing list of companies that are now going digital with their warranties and offering better post-sales experiences.

The Response

Manufacturers and companies can now harness IoP technology to deploy after-sale services and Bulgari has done just that. When a customer purchases a Bulgari timepiece, a 2-year digital warranty card is activated by the company, linked to the timepiece information record using its unique serial number and stored on the Bulgari network online. This digital warranty linked against the timepiece can now be accessible worldwide by any Bulgari boutique, searched against the serial number allowing the customer to claim it anywhere in the world without having to carry a physical document. Customers can also download and store their digital warranty copy using the Bulgari Vault mobile application.

When it comes to warranty management, IoP enabled applications can empower companies to have improved, more effective warranty procedures. Being able to access product warranty information digitally from anywhere reduces paperwork efforts, cumbersome processes, and costs. Imagine this, you live in the USA and just purchased a camera for your next vacation.

The camera faces some technical issues while you are traveling to France for vacation. Unless you have a digital record of the camera and its warranty information, claiming that warranty in France is not likely to happen. Bulgari's digital warranty process raises the bar for post-sales experiences and alleviates some of the limitations of the traditional process.



<https://www.bulgarivault.com/>

The IoP Connection

The core of a digital warranty lies in extending a product data model to include warranty related attributes. Attributes such as the name of the owner, address, contact details, location of purchase, date of purchase. These can easily be collected and written to the digital record by scanning the product identifier (barcode), picking up the serial number and appending all these details stored on the user's phone with the click of a button. Warranty activation can be as easy as scan and click "activate". Since the warranty record is attached to the product record or instance available on the Internet, it can be recalled from anywhere when required by an outlet or even the product owner who can easily use the online record to transfer the ownership of the product and warranty with another scan and click. The Internet of Products can change the way we look at warranty management and post sales services such as returns, servicing schedules and more.



**HOW A LEADING
PHARMACEUTICAL
COMPANY FACILITATES
CLINICAL TRIALS WITH
ELECTRONIC LABELS**

The Challenge

The process of clinical trials in drug research and development within the pharmaceutical industry is a core activity. Information transfer from company to the patient, company to healthcare professionals administering the trial drug and collection of feedback from patients and healthcare professionals involved in the trial back to the company are key and there are limitations of how much information can be carried on the label or even on a printed leaflet that accompanies the drug packaging. The process requires tracking of individual doses, keeping an eye on the expiry dates, the study subjects to whom a dose has been administered and more. A leading global pharmaceutical company recently working with Qliktag, devised an innovative approach to this using the internet of Products concept to make the process more efficient.

The Response

The company developed a mobile application that can be shared with healthcare professionals and patients to scan a datamatrix label carried on the trial drugs. On scanning the datamatrix, the mobile app would authenticate the product, process the serial number of the dose, check the expiry date and pull up an electronic label / e-label specific for that instance of the trial drug. The e-label would display the serial number and warn the user if the expiry date has been passed or indicate whether it is within the prescribed date. It also displays images, information about the drug, information about the clinical trial, video instructions, warnings, instructions, visual representations, contact details and more. In addition to the information it provides to those involved in the trial, it also enables the user to submit their feedback via a form, and the information submitted can be logged within the system against the specific dose allowing the team to gather feedback on an individual level as a part of the study.

The use of datamatrix codes within the pharmaceutical industry has been growing rapidly and pairing the identifiers that can be stored within a datamatrix with a digital record or instance of a pharmaceutical product enables some terrific applications in counterfeit tracking, batch tracking, expiry tracking, recall, traceability, labeling information compliance, regulatory compliance and a number of other areas.

No SIM 1:29 PM

< Adol 500mg Suppositories

PHARMA-FACTS
BY QLIKTAG SOFTWARE INC.



ADOL 500MG
SUPPOSITORIES



Batch No - 388F
Serial No - 73894567
Expiry Date - 21/3/2016



This product is expired
and is not safe to
purchase.

No SIM 1:30 PM

< Adol 500mg Suppositories

PHARMA-FACTS
BY QLIKTAG SOFTWARE INC.

Report This Product

Select the issue with the product...

☐ Product passed expiry date
☐ Product packaging damaged
☐ Suspected counterfeit product
☐ Quality Issue
☐ Other

Please provide details on the issue

Please provide details on the issue

Submit

The IoP Connection

Data matrix codes are able to hold structured attributes such as an identifier, manufacture date, expiry date, batch number and more. These are readable by scanners and could be used to create a corresponding product record on a batch level or serial level to which feedback and other data can be written to or details like instructions, warnings, content and authentication attributes can be read from as in the case of this Pharmaceutical organization. As a result, companies can present more information about what is being offered, gather data against the item or track the items. Another great example of how the Internet of Products is shaping consumer transparency efforts in the healthcare sector.





HOW TESCO'S HOMEPLUS VIRTUAL STORES TAKES THE SUPERMARKET TO THE PEOPLE

The Challenge

The consumer retail space is constantly being impacted by the behavior and lifestyles of consumers. Consumers today are often tied to their work schedules around the clock and barely ever find time to travel to their local supermarket let alone spend time walking around the aisles shopping on weekdays. It's a matter of pulling people away from their everyday schedule and commuting route. What if you didn't have to? What if you could take the brick and mortar store experience to the shopper? Ever since Tesco opened its first virtual store in Korea back in 2011, store technology has been moving fast. Today, where people do not have the time to stop and shop, virtual stores are moving to where the shoppers are. Being able to view products virtually in the form of life-sized aisles enable on-the-go shopping where customers do not even have to worry about payments or delivery. Automated retail technology has challenged the idea of shopping, as we know it.

The Response

Tesco in collaboration with Samsung successfully launched their first Homeplus store in a Seoul subway station back in 2011. The idea was to target customers in a high traffic area and enable them to shop virtually for basic everyday groceries since most of them do not have time to stop at the nearest brick and mortar store. Life-size images or virtual store shelves were setups in high traffic areas of the subway or bus stops where each item could be viewed visually and carried a QR code. Tesco customers could then download the Homeplus mobile app on to their phones and scan QR codes for the items in the virtual store to add them to their digital online shopping cart as they walk through. They would then select their preferred delivery time and complete the payment online through the app so the items could be delivered often the same day when they get home. This proved highly convenient for the fast-moving busy lifestyle of South Korean urban consumers who spend a significant amount of time on public transport commute.

Following this, Walmart and Mattel Canada also teamed up in 2012 to develop the first virtual toy store in Toronto around the holiday season. The virtual store's display aisles were in the same format as a brick and mortar store so that it was familiar to the consumer. The basic idea was to enable customers to turn their smartphones into a shopping basket and order products by scanning a QR code. Such Internet-based retail solutions have paved the way for the era of the Internet of Products in which the lines between the physical and the virtual have blurred, enabling advances which would have previously been impossible.



Image courtesy: <http://pix.avaxnews.com/>



Image courtesy: <https://gigaom.com/>

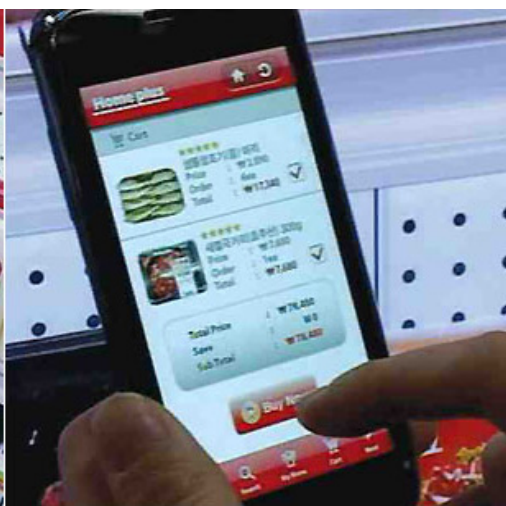
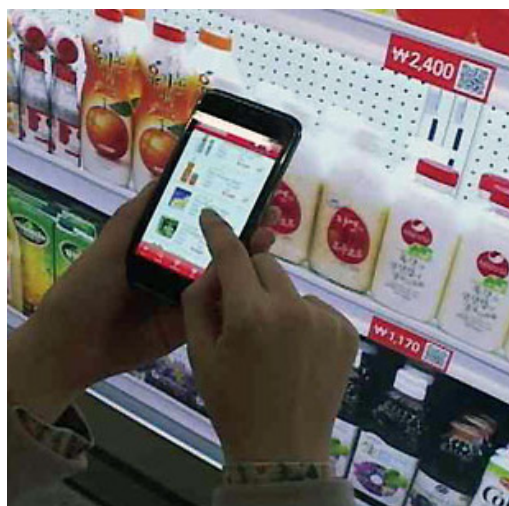


Image courtesy: <https://quartsoft.com/>

The IoP Connection

By engaging customers through their smart-phones and enabling them to shop on the go, retail has become more advanced, futuristic and technology dependent. By creating a digital representation or record for products online and then designing an experience of that product that consumers can interact with, virtual stores augmented reality experiences and displaying virtual products linked to real-world product delivery has been made possible. Having an IoP model for retail stores allows people to connect with products through their phones, virtual shelves, digital labels and mobile experiences virtually anywhere at any time removing physical obstacles and constraints.



HOW OFO HAS TAKEN THE BIKE SHARING EXPERIENCE TO THE NEXT LEVEL

The Challenge

“The Sharing Economy” is no longer just a buzz- word, it’s rapidly becoming evident especially among the millennial generation and post-millennial owning something isn’t necessarily the best approach when sharing makes sense. The rise of Airbnb, Uber, Lyft and other sharing economy model-based companies are a testament to this. Added to this, everyday commuting can be challenging and is an important part of our lives. Even if you take public transport like cabs or subways, last mile commuting also needs to be considered. So does the aspect of climate change, overcrowding of city roads and sustainability of transport for our future. There is the wave of companies doing some great work around renting bicycles and bike sharing and one such interesting implementation of this is China’s innovative bike-sharing company Ofo.

The Response

Ofo offers commuters bike sharing in urban locations with a slight difference. Unlike companies that offer bicycles through docks from where they can be picked and returned, ofo allows its users to pick up a bike from anywhere and park it anywhere when they're done. Users would need to download the ofo app, sign up and locate an available bike in their vicinity. Once they've found one, they would use the app to scan a QR code on the wheel lock to unlock the bike which then creates a ride session so they can use the bike to complete their ride. When they have reached their destination, they would then scan the QR code again to "lock" the bike in a safe, legal parking space. By locking the bike, the user would have ended the ride session just as an Uber ride would end and pay for their ride through the app. All without the need for special bike docking units and having to leave the bike at a specific destination.

Bike sharing apps have seen great potential and response in recent times and the ofo model highlights how the IoP can also apply to things within the sharing economy which is shaping our future.

It is an effective way sharing ‘things’ or products and making them available for a fee rather than requiring ownership or outright purchase. Founded in 2014 and based in Beijing, China’s Ofo is currently the world’s largest station-free bike sharing platform. Given the traffic challenges the country faces, these innovative means of bicycle sharing look promising. IoP based transportation services have greater potential that needs to be further explored in the coming times.



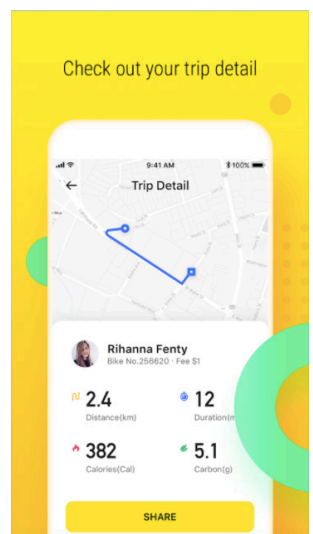
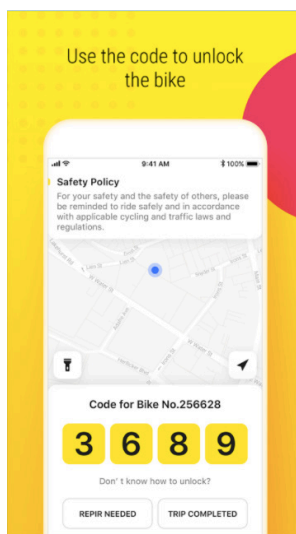
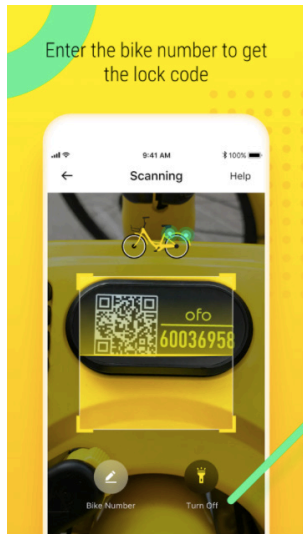
Image courtesy: <https://princeoftravel.com/blog>

The IoP Connection

The ofo mobile app carries the user profile and all the functionality that is key to the way the system works. The QR code on the locking system would in effect be a unique identifier to each bicycle in the inventory and when the bike is unlocked, a ride session is logged against that specific bike where the point A location is logged, the route, distance and other details for the ride. On locking the bike at its destination, the location for point B is logged with the distance, ride time and all against the individual product record, which in this case – is the bike. While each user has an instance of the mobile application or an account within this system, each bike has a digital record or unique identifier too against which transactions or sharing history can be recorded. It's this combination that makes ride sharing not just possible but highly efficient and trackable. This is a concept that can be applied to other areas of product sharing as well whether it entails books, workspaces, fashion accessories, luxury items, appliances or other products/things that could join the sharing economy.



Image courtesy: <https://www.bloomberg.com/news/>



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A NEW ERA

In Conclusion

These are just some of the possibilities behind creating virtual representations of real life physical products. When it comes to the applications of IoP however, we have barely scratched the surface and there is an immense potential to build even more useful solutions. With millions of consumer products moving around the world through different global markets, it's not just the lure of being able to perform "actions" on digital representations of real things that should excite brands as well as consumers. It's also an opportunity to generate, track and analyze big data that will be generated by these interactions. Data that could help organizations know each individual customer better, understand buying behavior, preferences, track movement of individual products across the globe to start off with. Data that can tackle issues like food waste, dietary & health issues, smart consumption.

IoP has the potential to improve consumer transparency, personalize information delivery across borders and languages, automate supply chain operations, enable a more efficient sharing economy, improve safety measures and predict recall implications. A concept as simple as being able to create interactive digital identities for real world "things" and the ability to manipulate those identities via the internet could change the way things are done today.

About Qliktag

Qliktag Software Inc. is an innovator of software solutions that bridge the gap between brands and buyers – fostering, trust, stronger relationships and more personalized connections between the two.

Headquartered in Newport Beach, California, the Qliktag Internet of Products cloud-based software platform allows brands and manufacturers to aggregate, manage and expose their products as digital entities over the Internet to be accessed by various applications and systems connected to the Internet. Combining the features of a PIM solution and an Internet of Things platform, the Qliktag Platform is an enabler for driving new-age digital businesses and processes for the consumer products industry.

The platform also enables designing & deploying interactive digital experiences for each product SKU, batch or serial instance which can be activated on the product via triggers such as QR codes, barcodes, data matrix, Bluetooth beacons or at the point of consideration/purchase using an internet connected device.

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Thank You

Some watershed technological innovations have proven to alter the course of history. From the birth of the World Wide Web to the era of e-commerce and the emergence of social media as people's media, technologies have been instrumental in shaping the world as it is today.

Today, the phenomena of "Internet of things" allows everyday objects and devices connected to the internet to interact with each other and exchange data. As a result, the space between the physical and digital is gradually reducing. While the phenomenon of the internet of things is gaining momentum, it ignores the larger world of "things" one uses in daily life which can't connect directly to the internet themselves.

The "The Internet of Products" attempts to decode the larger opportunity that lies in the world of pseudo-connected internet of things. It looks into the larger world of products and things that can not connect directly to the internet but which could potentially participate within the "Internet of Things" through creating digital representations of real world objects and interacting with them. The book covers some real world innovative cases where brands or retailers have used the underlying concepts behind the "Internet of Products" and looks at the potential it has to impact areas such as healthcare, automobile, retail, apparel and lifestyle effectively being the next big technology paradigm shift.

By Qliktag Software Inc.

