The Future of Connected Products

Avery Dennison
Labels and Packaging Materials

September 2019

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Understanding the Value of RFID and the Future of Intelligent Labels

Beyond UHF RFID

Topics for today:

- Janela™

- NFC—Silicon based

- Pragmatic low cost, scalable NFC

- Wiliot—Battery free Bluetooth

Why Connected Products?

JANELA™

Consumer Behaviors Today

It's a mobile-first world. With information and services at their fingertips, customers expect faster, better and relevant services.

82%

of smartphone users say they consult their phones on purchases they're about to make in a store.*

82%

of smartphone users say they turn to their phones for ideas in the middle of a task*

90%

of smartphone users are more likely to buy from companies whose mobile sites or apps help them easily find answers to their questions **

56%

of offline retail sales are influenced by Digital.***

*Source: Google/Ipsos, U.S., March 2015, n=5,398, based on internet users.¥
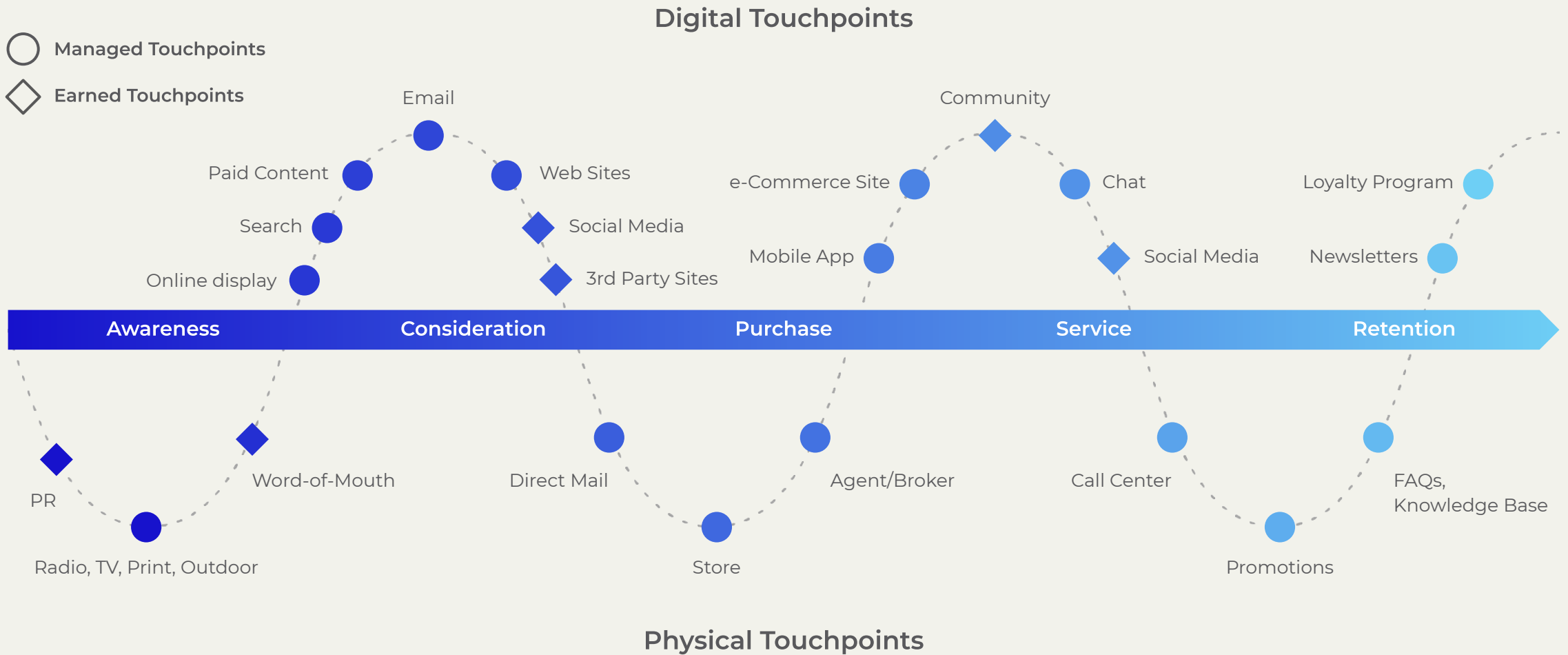**Source: Google/Ipsos, U.S., August 2015, n=1,291 online smartphone users 18+
***Source: Deloitte, U.S., September 2016 "The New Digital Divide"

Today's Customer Journey

Over the past decade, the customer journey has become increasingly digital and complex thanks to high smartphone penetration.

Consumers now interact with brands via multiple digital channels in addition to offline, anywhere and anytime.
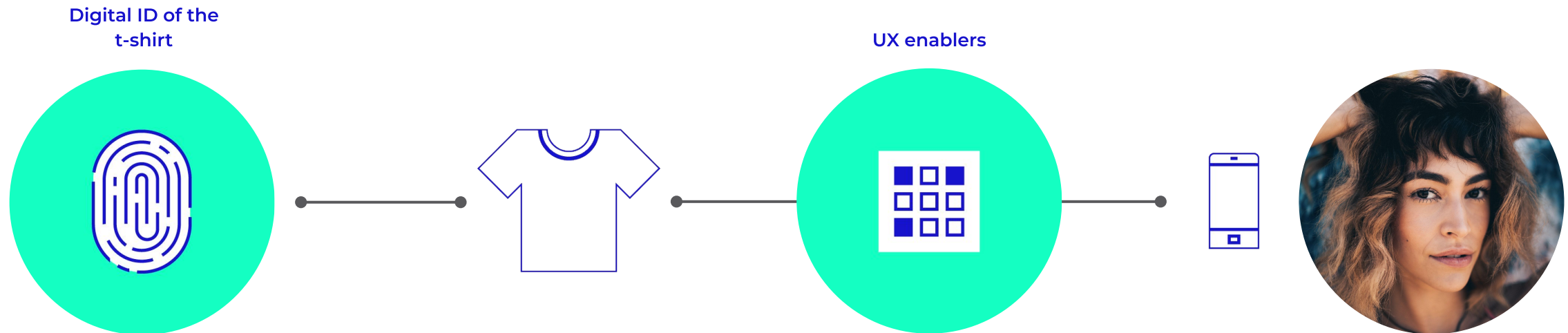
Today's Customer Journey

Digital Touchpoints

○ Managed Touchpoints

◇ Earned Touchpoints

Email

Community

Paid Content

e-Commerce Site · Chat · Loyalty Program

Web Sites

Search · Social Media

Mobile App · Social Media · Newsletters

Online display · 3rd Party Sites

| Awareness | Consideration | Purchase | Service | Retention |

Word-of-Mouth · Direct Mail · Agent/Broker · Call Center · FAQs, Knowledge Base

PR

Radio, TV, Print, Outdoor · Store · Promotions

Physical Touchpoints

Janela™—A digital identity activation solution

Janela™ is a platform for creating item-level digital identities for physical products. These identities can be interacted with by consumers using their mobile device. Combining a brands' digital experience with the physical product.

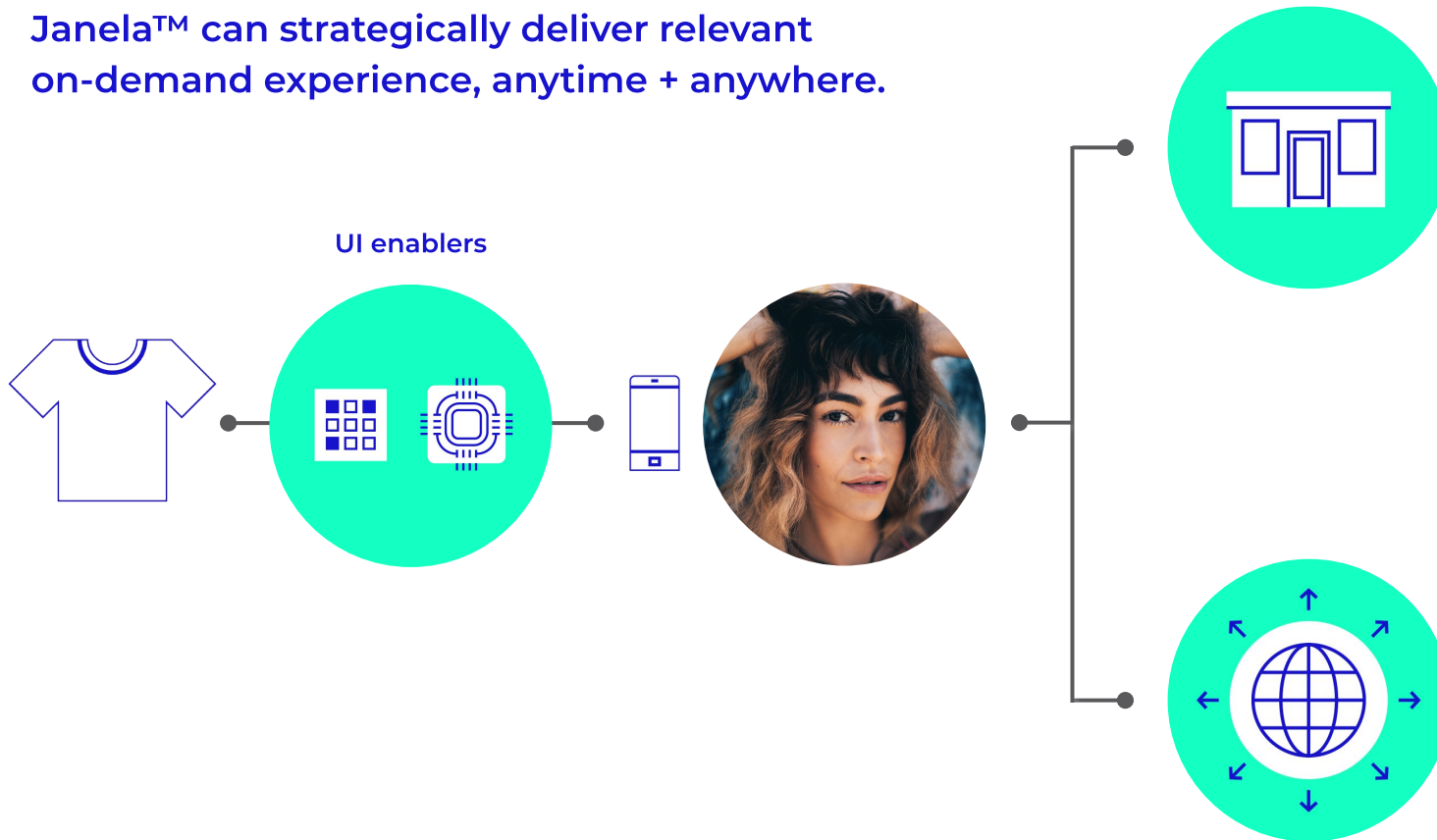Your product as the new interface between your brand and your customer:

Digital ID of the t-shirt

UX enablers

Short URL
https://tn.gg/gtin/00860080001300/ser/549?sec=12r2134iu7

Possibilities—CX to unlock with Janela™

Janela™ can strategically deliver relevant on-demand experience, anytime + anywhere.

UI enablers

Brand/Retailer controlled environment (in-store condition)

- community-focused product reviews
- intelligent product recommendations
- real-time discount/perk offers
- in-store product search assistance
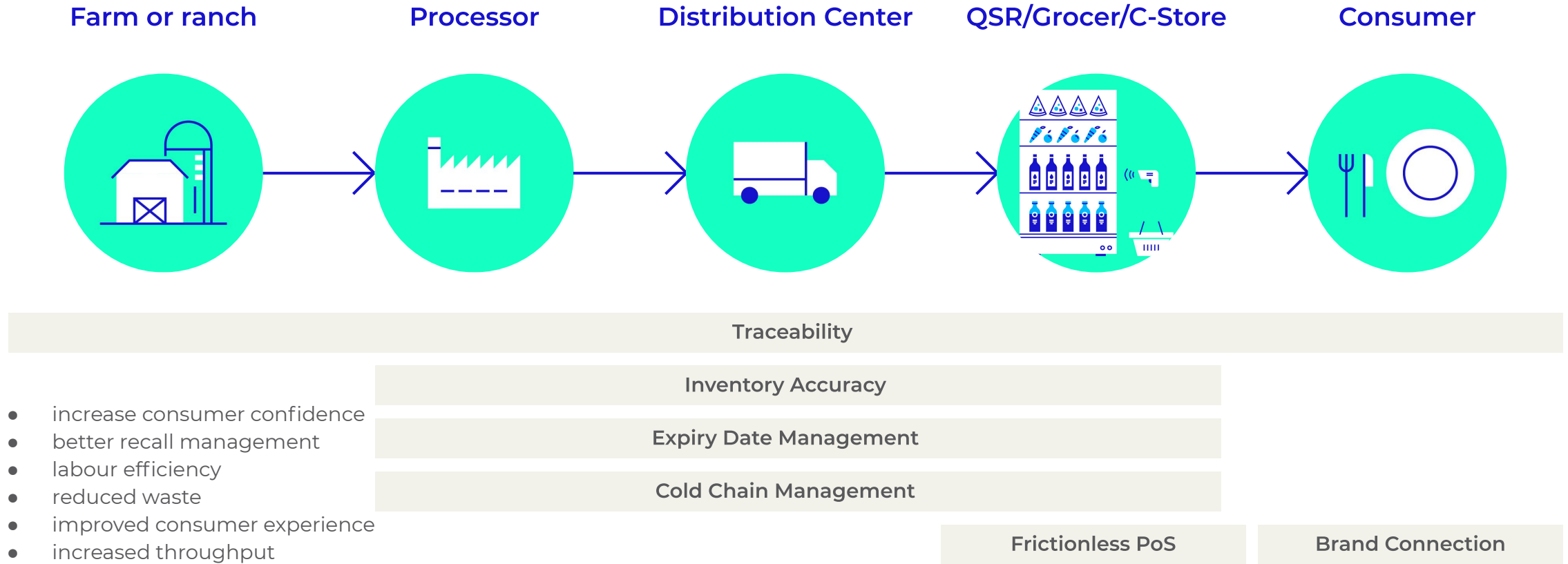- access to exclusive loyalty events

Uncontrolled environment (anywhere pre/post purchase condition)

- product tutorials/information
- product traceability/authenticity verification
- tracking of personal closet items
- tracking change of ownership via sustainability program

Solution—Visibility across product life-cycle for brands/'retailers'

Digital ID generation

ID data management

Input across product life-cycle

Real-time product + consumer analytics

- Integrations
- Analytics
- Real-time data management
- Security and access control
- Cloud platform -as-a-service

materials + ingredients provenance sustainability data

who, when, where consumer patterns consumption data

when, where made batch production line packaging components

In which store Shopper engagement Product authenticity

who, when, where consumer patterns consumption data

live usage data proactive monitoring replenishment data

where recycled sustainability data change of ownership

Rules engine can be modified to meet user's purpose

Solution—Visibility across food supply chain

Farm or ranch **Processor** **Distribution Center** **QSR/Grocer/C-Store** **Consumer**

Traceability

Inventory Accuracy

- increase consumer confidence
- better recall management
- labour efficiency
- reduced waste
- improved consumer experience
- increased throughput

Expiry Date Management

Cold Chain Management

Frictionless PoS

Brand Connection

Solution—Item level UX-enablers

Printed serialized QR code

Trigger method

- Camera captures URL information via scanner

Experience by OS

- iPhone—Camera captures URL information via scanner
- Android—Depends on device, most require 3rd party app
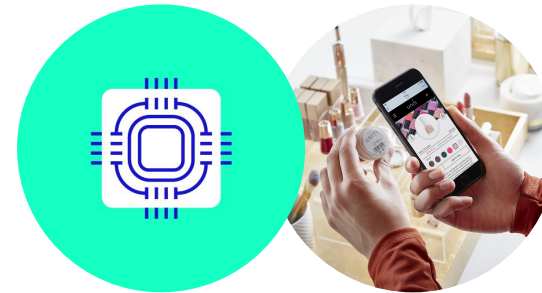
NFC

Trigger method

- Tap the NFC embedded
  (may require 3rd party app for iOS devices)

Experience by OS

- iPhone 7, 8, X—3rd party app required to read tags
- iPhone XS, XR—Native (**URL Reading only)
- Android—Native Reader

NFC

Intelligent Labels Today—UHF vs. NFC

UHF (Ultra High Frequency) RFID: One to many

- Reader/antenna combo designed to pick up many tags at range
- Requires a reader/antenna not available in today's smartphones
- Primary Use Cases—Inventory, Supply Chain, Loss Prevention
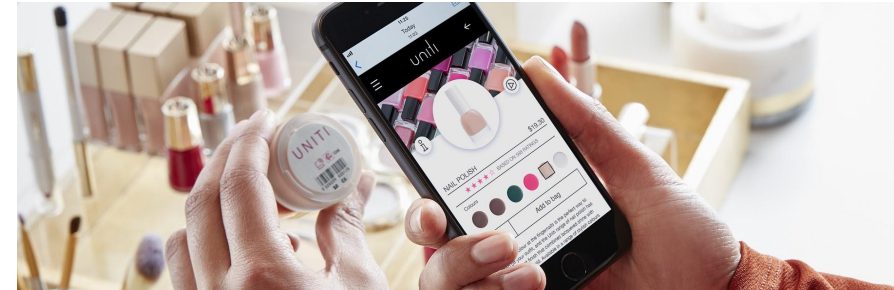
NFC (Near Field Communication) RFID: One to one

- One reader connects to one tag at very close range (by design)
- Reader is consumer's smartphone. Android and finally iPhone
- Primary Use Cases—Tap Payment, Consumer Engagement

NFC merges digital and physical

Item with NFC tag

Consumer with smartphone

Real-time data and brand engagement
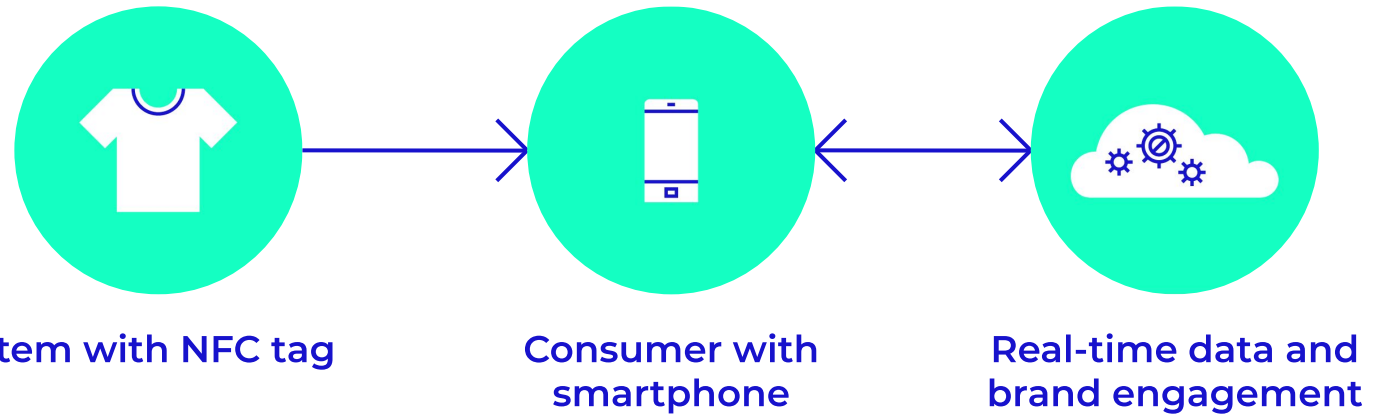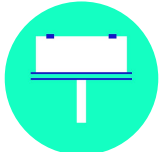
NFC connects your brand's message directly from your product package to the consumer, via their smartphone
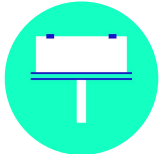
6 billion NFC handsets in use globally by 2020
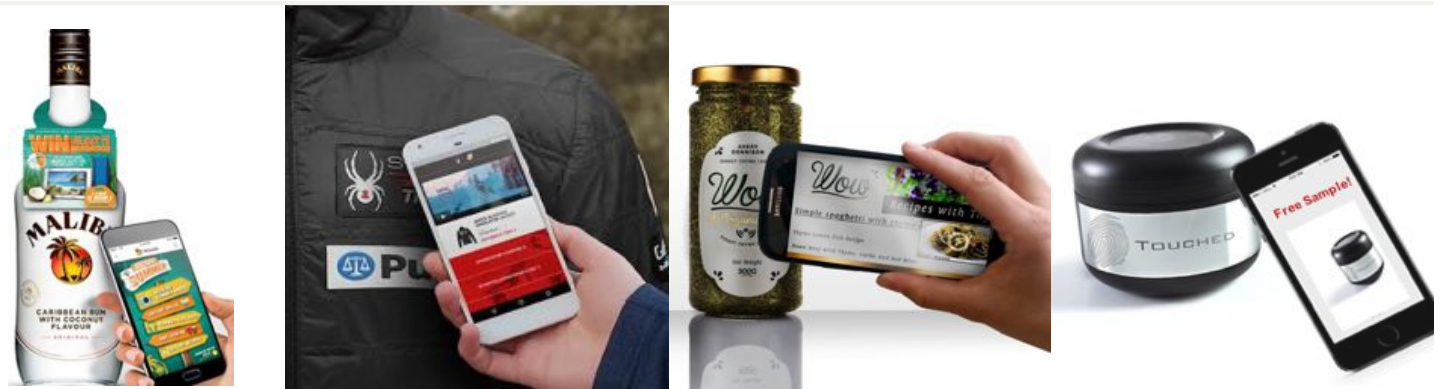
Marketing Media

Media	Type	Duration	Interaction	Cost
	TV ad	Weeks	Seconds	High+
	Billboard	Weeks	Seconds	High
	Product Placement	Seconds	Seconds	Medium

Marketing Media

Media	Type	Duration	Interaction	Cost
	TV ad	Weeks	Seconds	High+
	Billboard	Weeks	Seconds	High
	Product Placement	Seconds	Seconds	Medium
	Package	**Long time**	**Continuous**	**Low**

The Future of Connected Products

Product Package is a Brand's Owned Media!
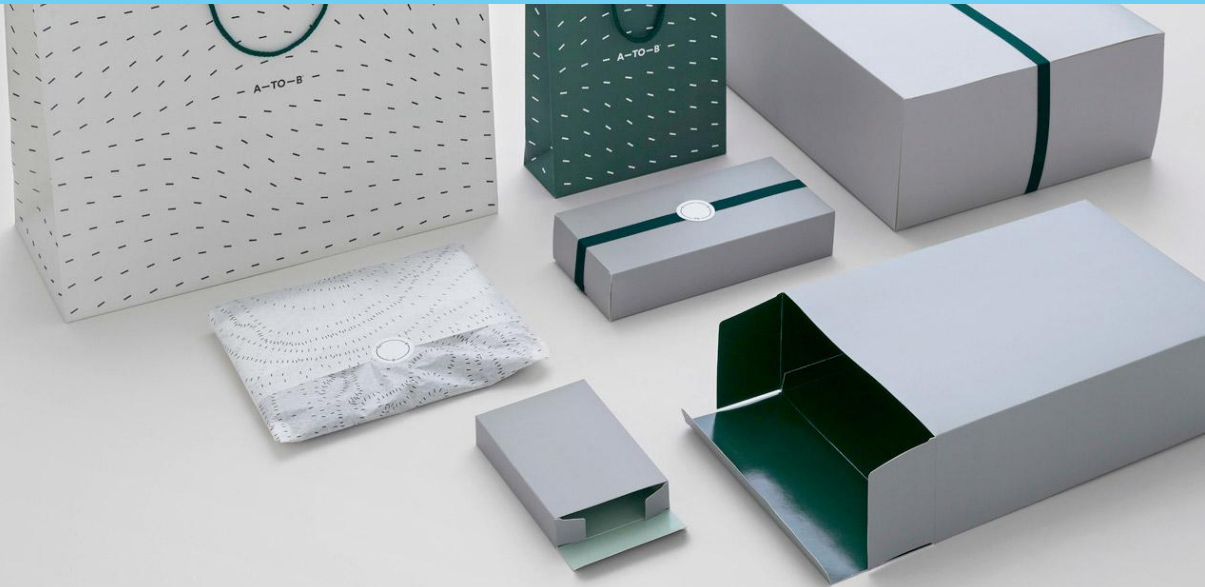
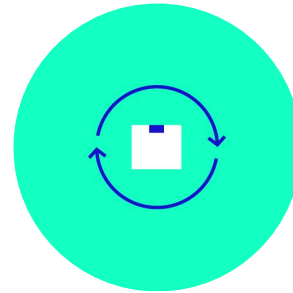# NFC can be converted into packaging easily
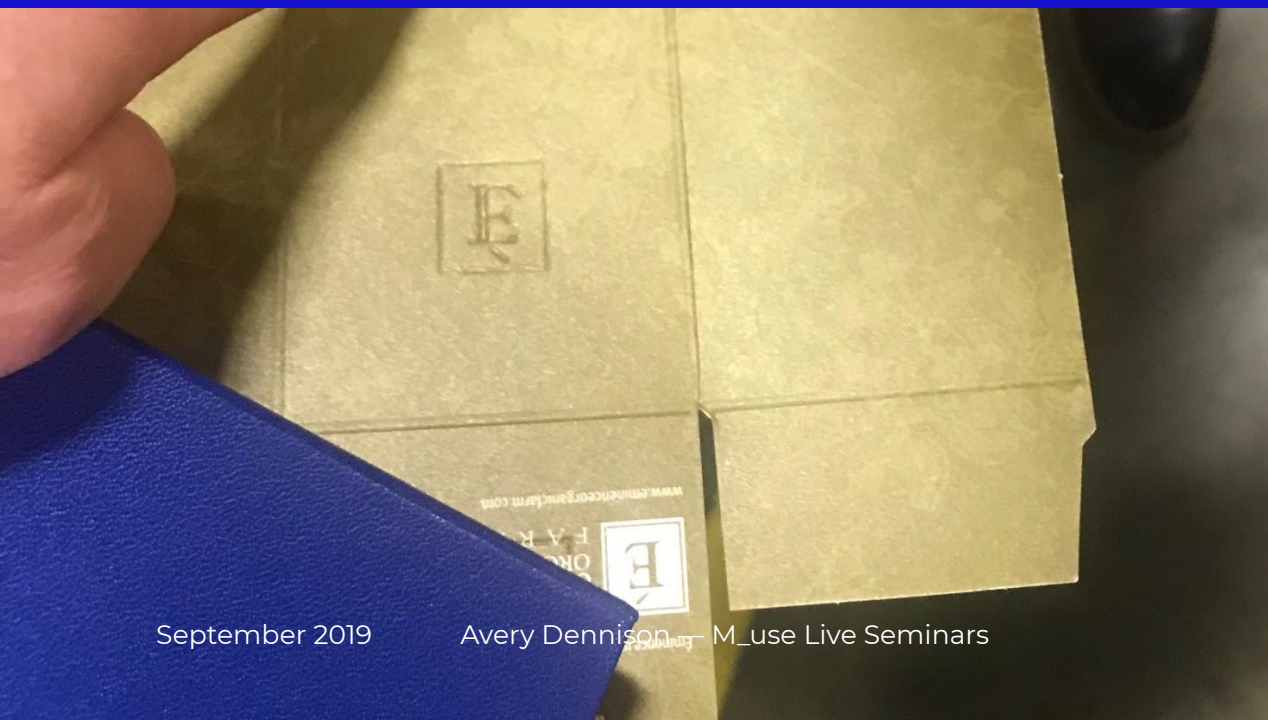
NFC merges digital and physical

Social Media Campaigns
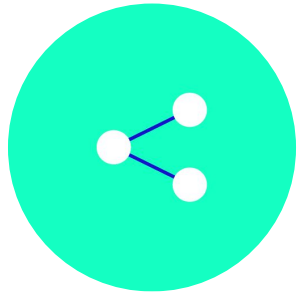
Key Product Information

Re-order capability

Brand protection
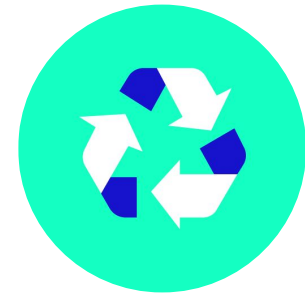
Product registration + loyalty programs

Product usage + tracking

Gaming + interactive market

Product lifecycle + recycle

NFC vs. alternatives

NFC is the easiest way for consumers to engage with products...

- Quick and easy-to-use; simply tap phone to product
- No app to download
- No unsolicited advertising or annoying pop-ups
- 1-to-1 communication
- Doesn't take up branding 'real estate' on label or package
- Targeted use cases including mobile marketing and anti-counterfeit

New Technologies
Lower cost NFC

NFC—Today's Challenges

Due largely to cost, NFC consumer engagement programs have so far been focused only on premium products or limited scope campaigns

Brand	NFC Use Case	Scope
JAMESON	Product information; contests	St. Patrick's Day promotion in Ireland
MALIBU	Recipes; product information; contests	Promotional campaigns
SPYDER	Social media; ski location information	USST jackets ($250 average price)
Le Pin POMEROL	Authentication	All bottles ($3,000 average price)
MINERAL FUSION	Consumer engagement; brand story video	One-time trial product displays in Whole Foods
adidas	Product information; community engagement	Limited edition shoes, World Cup Football

Flexible Integrated Circuits

Silicon NFC (apparel, such as shoes and shirts)
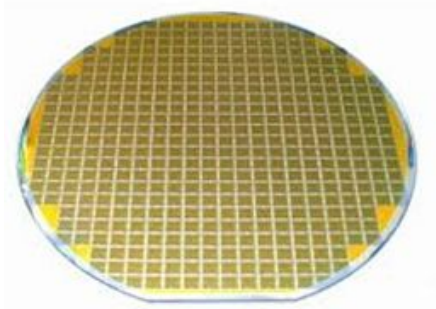
Silicon IC Wafer

Silicon NFC inlay

FlexIC NFC

FlexIC sheet

FlexIC NFC inlay

- **FlexIc's can substantially reduce inlay cost**
- **enable extreme thinness, flexibility & durability**

Enabling Trillions of Smart Products

Flexible integrated circuits

- Electronic tagging solutions at a cost of a few cents
- Thinner than a human hair
- Flexible and conformable
- Highly scalable production model
- Recyclable & sustainable
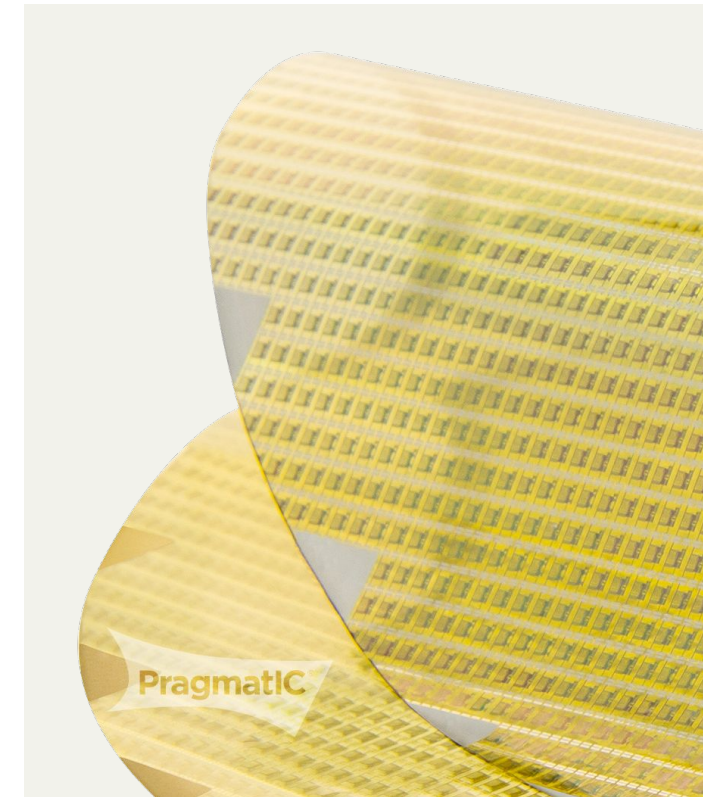
Enabling NFC in Everyday Objects

Avery Dennison

- World's largest UHF RFID provider
- Leader in self-adhesive materials
- Relationships with major converters
- Proven pilot and adoption processes
- Global capabilities
- Rapid prototyping and application testing capabilities

PragmatIC

Global leader in ultra-low-cost integrated Flexible circuits (FlexICs) which are:

- Flexible and conformable
- Thinner than a human hair
- Highly scalable production model
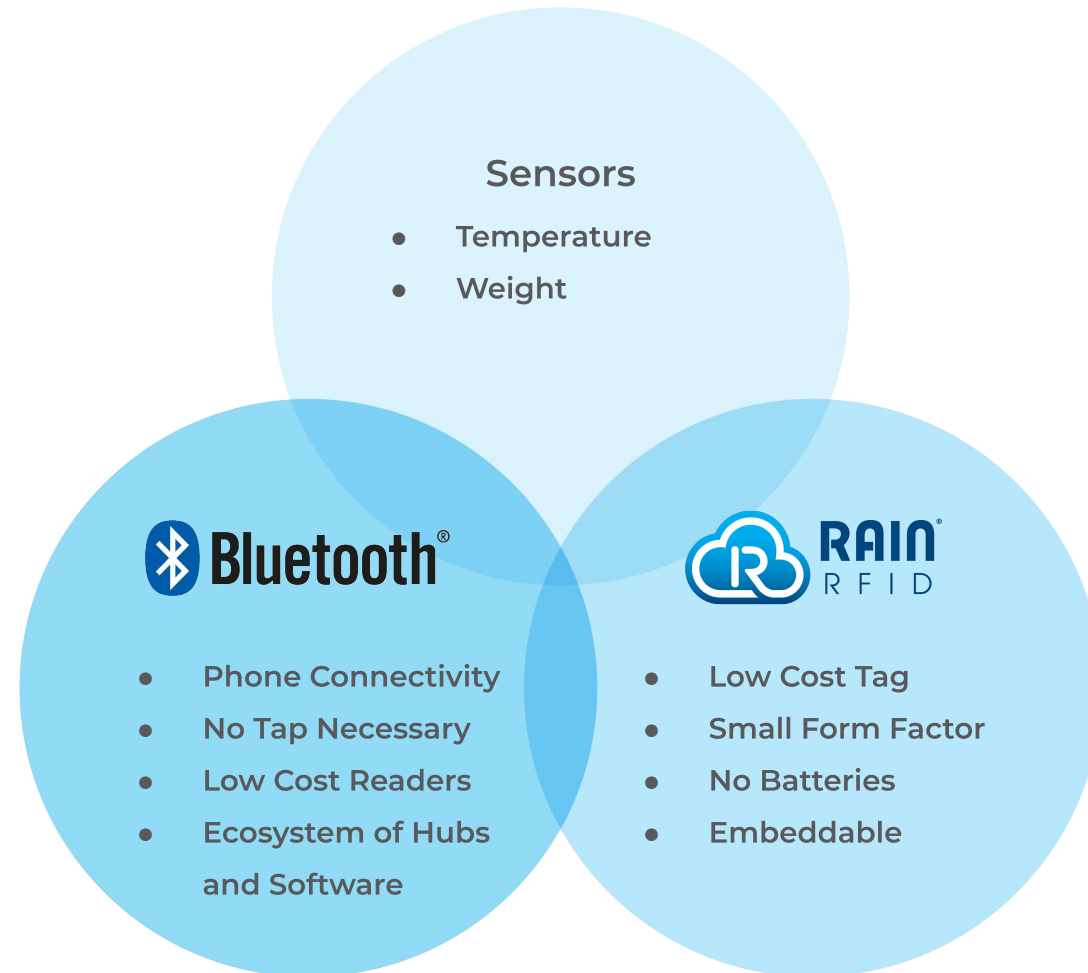- Shareholders include Avery Dennison
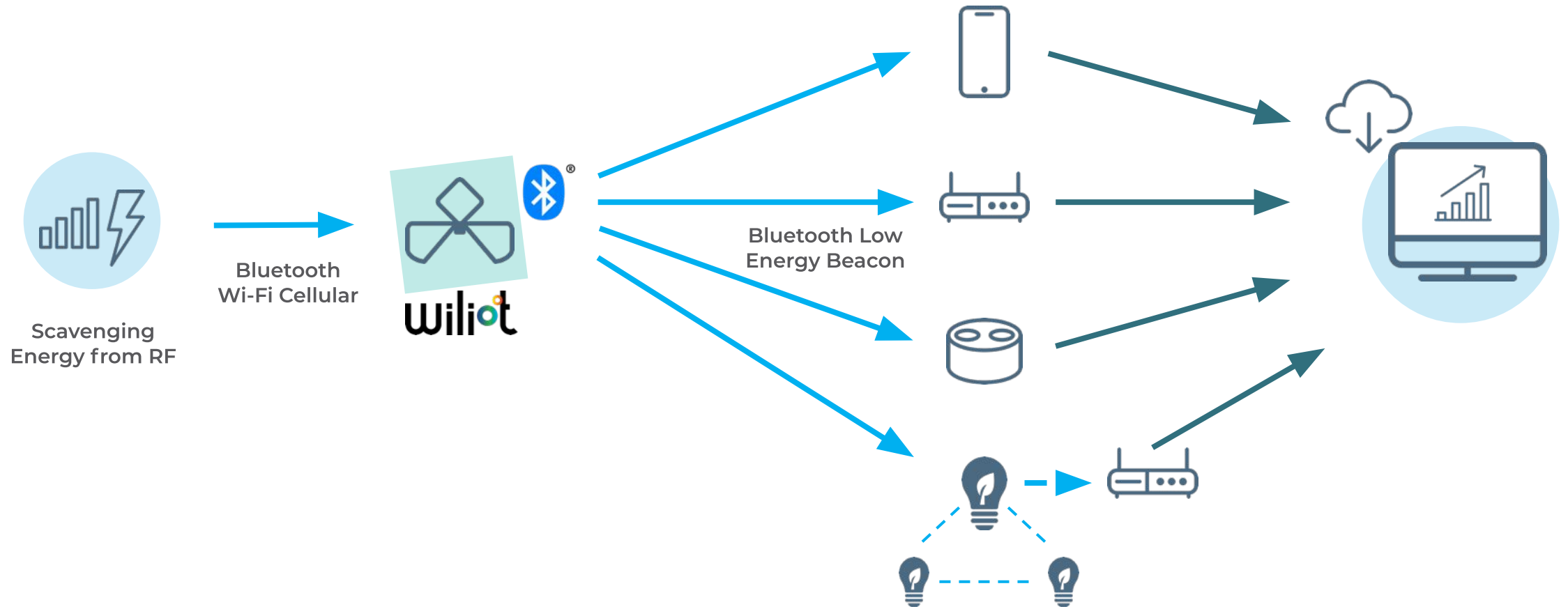
New Technologies

Williot—Combines Rain RFID and Bluetooth

Key use cases

- Asset tracking
- Secure locker delivery
- Real-time inventory
- Auto replenishment
- Lost and found
- ...and more

Sensors

- Temperature
- Weight

Bluetooth®

- Phone Connectivity
- No Tap Necessary
- Low Cost Readers
- Ecosystem of Hubs and Software

RAIN® RFID

- Low Cost Tag
- Small Form Factor
- No Batteries
- Embeddable

From RF Energy Scavenging to IOT Analytics

Scavenging
Energy from RF

Bluetooth
Wi-Fi Cellular

Bluetooth Low
Energy Beacon

Avery Dennison's Role

Partnership in

- Inlay manufacturing roll to roll expertise
- Go to market

Other Williot investors include

- Samsung
- Amazon
- Qualcomm
- Merck

Conclusion

- Janela™—Digital identity to enable consumer engagement and brand protection

- NFC—Traditional silicon

- Pragmatic—Flex IC based NFC

- Wiliot—Battery free bluetooth

Thank You

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