



RFID

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The Current State of the Internet of Things

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Where did IoT come from?

- The phrase was first mentioned in 1999 in papers published by the MIT Auto-ID Center.
- RFID was part of the IoT vision from the start...the Auto-ID Center and its project partner, EAN-UCC (now GS1), considered best suited technology to support and enable IoT as defined.
- There are many definitions: basically it is an infrastructure of interconnected objects, people, systems and information resources together with intelligent services

Remember

- The IoT is NOT a Technology or an Industry
- The IoT and smart systems are driven by a combination of:
 - Sensors and actuators
 - Connectivity
 - People and processes

So What it IS and what it is NOT.

- IS
 - A means to improve business
 - A way to identify and track everything
 - The first step to awareness of everything
 - Connectivity for everyday items, not just powered items
- IS NOT
 - The easy answer to everything
 - The solution to bad business practices
 - A quick, cheap way to make everything right
 - Being able to turn on your house lights from your phone

What Does IoT need?



- Front End Technology (Identify the Thing)



- RAIN RFID
- Zigbee
- Bluetooth
- Wi-Fi
- LoRa
- NFC
- Barcode (2D)

Think about:

- **Form factor**
- **Power**
- **Communications speed/ capability**
- **Line of sight**
- **Compatibility with infrastructure**
- **Cost**



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Three “types” of carriers

- Zigbee, Bluetooth, Wi-Fi, LoRa
 - Powered connectivity, \$\$\$, long distance
- Barcode (2D)
 - Printed, read only, line of sight, \$, one at a time
- RAIN RFID
 - No batteries, hidden things, \$-\$\$, medium distance, fast (1000 items/second)

What is RAIN RFID?

RAIN RFID is a wireless technology that connects billions of everyday items to the internet, enabling businesses and consumers to **identify**, **locate**, **authenticate**, and **engage** each item



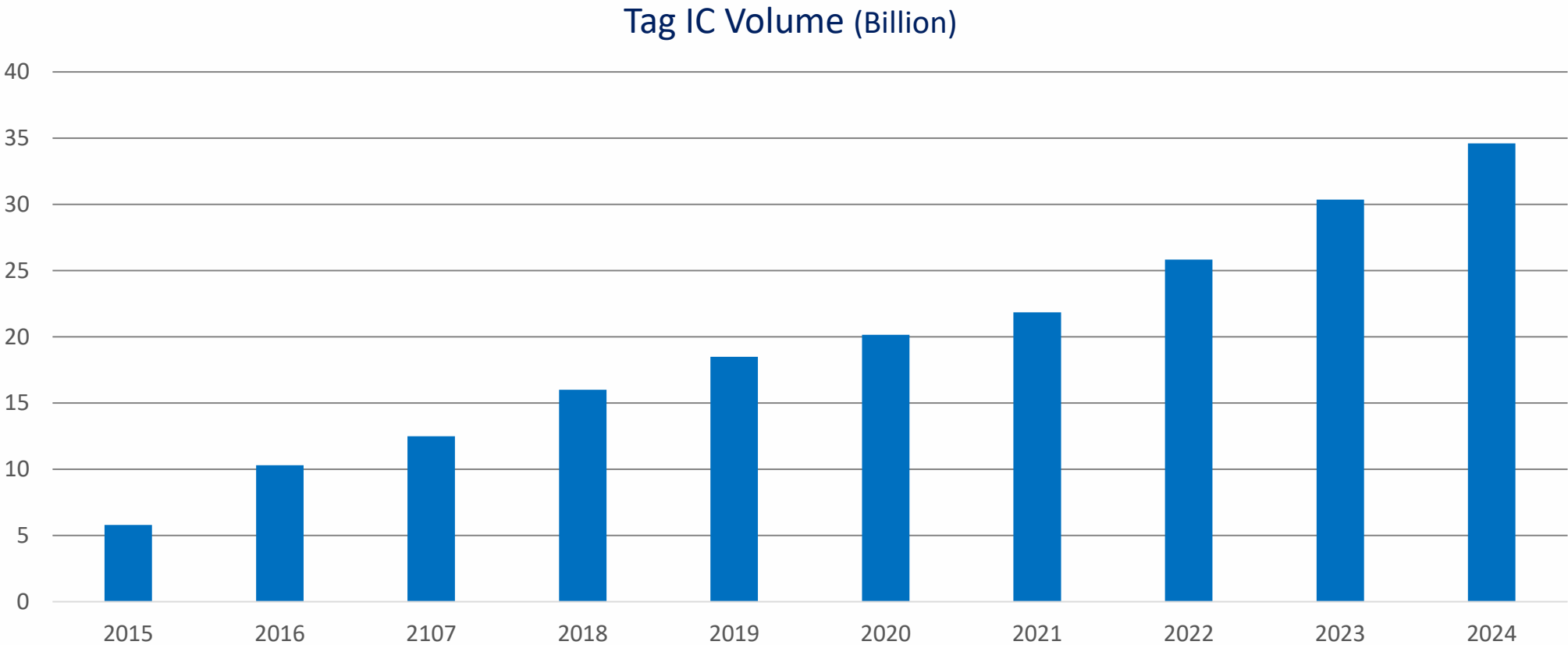
Just the facts?

- 20.4 billion devices connected to the internet by 2020, up from 8 billion in 2017
- Consumer use will be mostly smart TVs and digital set-top boxes with 5.2 billion devices
- Traditional computing devices (e.g. smartphones, tablets, smartwatches, etc.) will comprise more than half
- **BUT these are DEVICES not things**

Gartner Jan 2017

<https://goo.gl/TSxsiV>

Tag IC Volume



Data Collected by RAIN 2015-2019:
Forecast 2020-2024 – RAIN Market Research Report 2020



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Technical Challenges

- Identifying the “Things”
 - Sensors
 - What are sensors?
 - Storing data
 - How much data?
 - Type of data?
 - Format?
 - Segmented?
 - Security

Top IoT Applications today

- Smart Cities
- Smart Environment
- Smart Water
- Smart Metering
- Security & Emergencies
- Retail
- Logistics
- Industrial Control
- Smart Agriculture
- Smart Animal Farming
- Domestic and Home Automation
- Healthcare

Smart City

- Smart city covers a wide variety of use cases:
 - traffic management
 - water distribution
 - waste management
 - urban security
 - environmental monitoring

Smart Environment

- Forest Fire Detection
- Air Pollution
- Snow Level Monitoring
- Landslide and Avalanche Prevention
- Earthquake Early Detection

Smart Retail

- Growing at a fantastic rate
- Over 100 retailers currently using RAIN
- Big savings in inventory management
- Increases in sales
- Losses

RAIN in Retail



Over 100 retailers use RAIN RFID worldwide.

Industrial Control

- The Industrial Internet is talked about a lot (IIoT, Industry 4.0)
- Market researches such as Gartner or Cisco see the IIoT with the highest overall potential
- Potential to change the way we do business

Healthcare

- Digital Health/Telehealth/Telemedicine
- Smart watch/fitness band
- Smart pill bottles
- Smart operating theaters
- Integrated Clothing
- Smart asset tracking



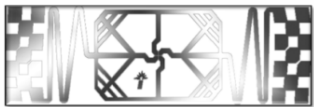
Sports

Marathon Bibs are IoT



- Improved Runner Tracking
- Social Media Integration
- Real-Time Race Updates

RAIN Tag



Courtesy of **IMPINJ**



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Smart Agriculture & Smart Animal Farming

- Farm to Fork initiatives
- Freshness tracking
- Refrigerated transport
- Vending machines



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Courtesy of  **IMPINJ™**

RAIN – Enabling the IoT

- Unique item identification
- Low cost
- Batteries not required
- Line-of-sight not needed
- Long or short range
- Security availability
- Connects to sensors

RAIN
IS EVERYWHERE

JOIN NOW
TO GROW THE TECHNOLOGY
IN YOUR MARKET

HEALTHCARE

RETAIL

LOGISTICS

PHARMACEUTICAL

INDUSTRIAL
MANUFACTURING

CONSUMER
SERVICE

IoT

PACKAGING

ELECTRONICS



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RAIN is an AIM Industry Alliance

www.RAINRFID.org

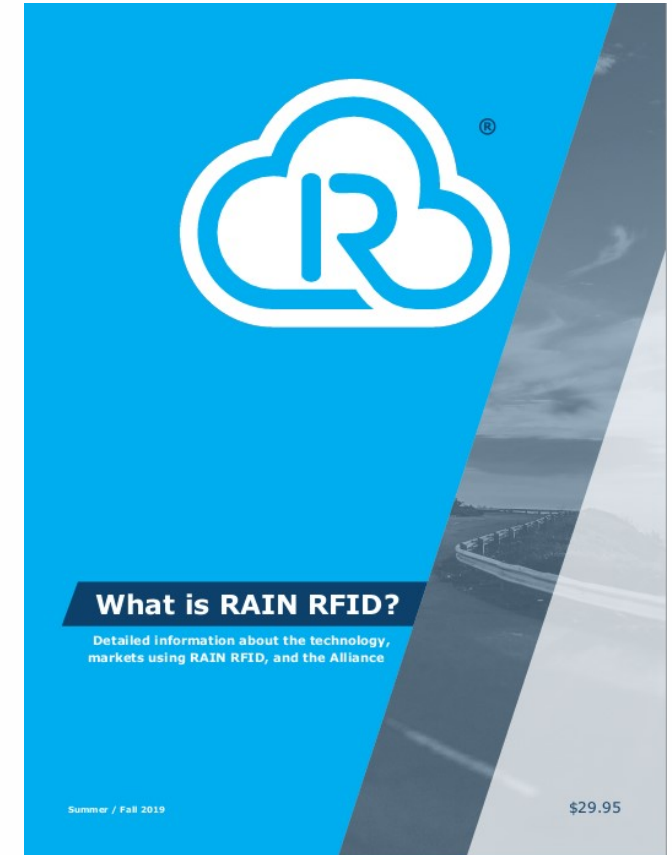


RAIN RFID Alliance

Membership: **160+** companies worldwide

Representing: passive UHF RFID

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Summary

- The IoT is about **THINGS** not Devices
- Things will mostly not have IP addresses
- Passive UHF RFID “**RAIN**” will have a major part to play
- We need to better vocalize the importance of the IoT to industry

The RAIN RFID Alliance

- How to Join RAIN
 - www.RAINRFID.org has the details
 - Dues are based on company revenue for providers
 - Manufacturers, System Integrators, Users, Academic Establishments, Test Houses
- Sign up for latest news
 - www.RAINRFID.org



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THANK YOU

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