

What RAIN RFID Brings to the Internet of Things



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Many people and organizations are working to reshape the definition, scope and technology path for the Internet of Things (IoT) – something to be expected with any popular trend. Today that definition goes beyond simply identifying and interacting with ‘things’, and includes an array of technologies from sensors and auto-ID, to near-field communication (NFC), Wi-Fi, and Bluetooth.

While the phrase Internet of Things often evokes images of ‘smart’ homes and interconnected ‘smart’ cars, the IoT presents a much broader range of new and compelling business applications across a variety of industries. By providing all kinds of objects with the capability to interconnect and share data, the IoT opens up a nearly limitless world of opportunities.

The true business value of the IoT involves the connection of physical equipment or assets to provide a higher level of service, efficiency and performance. In the industrial sector, the business drivers include cost savings, greater operational efficiency, increased productivity, reduced business risk, and improved compliance.

As currently envisioned, the IoT will consist of numerous interconnected networks based on a patchwork of specifications and standards. While some of these technologies are still being developed or even have yet to be imagined, others, such as RFID, are already well-established.¹

RFID BRIDGES THE GAP

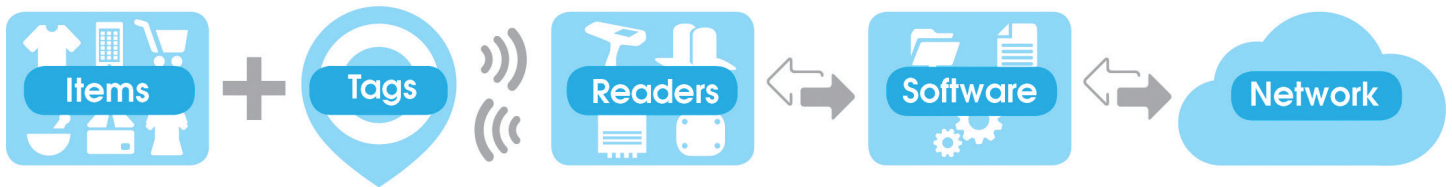
Virtually all IoT applications require a data connection between the physical and digital worlds, and RFID is the ideal technology to bridge these realms. Although some of these ‘things’ may be devices with their own IP addresses and built-in computers, an even greater number will be made up of smaller and less costly devices with no power source or inherent network connectivity.

In fact, as the IoT reaches critical mass, the majority of networked objects will be wirelessly connected via passive, low-cost RFID technology. While other wireless technologies require batteries or another power source, RFID technology makes it possible to network objects where local power is not feasible or even possible. This may include collecting information from items for long periods of time where swapping out batteries is not an option; items too difficult or even impossible to access; or situations where there are so many items involved that it’s simply too expensive to justify the use of powered devices.

Consequently, worldwide sales of RFID tags are expected to [exceed 9 billion](#) in 2015, compared with approximately 7 billion sold in 2014, according to market research firm IDTechEx.

¹“Internet of Things breathes new life into RFID technology”; CIO Magazine, June 1, 2015: www.cio.com/article/2929197/rfid/internet-of-things-breathes-new-life-into-rfid-technology.html

RAIN RFID



RAIN RFID CONNECTS THE DOTS

While RFID technology provides everyday objects with the basic capability to become networked, [RAIN RFID](#) connects the dots for a complete network system.

RAIN RFID is an ultra-high frequency (UHF) RFID wireless technology that connects billions of items to the Internet. RAIN RFID offers a simple solution to enable passive objects to communicate valuable data, identifying each specific object at an exact place and time. This unique identification allows these objects to become connected within the IoT, positioning RAIN RFID as an essential building block of these future networks.

Offering a combination of proven technology and mainstream applications, with a focus on robust interoperability, RAIN RFID adds intelligence to the IoT value chain and facilitates new applications for connected assets. To date, RAIN RFID technology has connected over 20 billion things², tracking the identity, location and authenticity of each item. Moreover, RAIN RFID will have a 29% compound annual growth rate – particularly in retail apparel, healthcare, pharmaceutical, supply chain and logistics applications.

THE RAIN VISION

The future of this technology is being shaped by a dedicated alliance of manufacturers, distributors, resellers and researchers. The global [RAIN RFID Alliance](#) is working toward a vision where everyday things are part of a connected world...like raindrops to the sea, through the collection of data that is stored, managed and shared via the Internet.

RAIN Vision

A future where
everyday things are
part of a connected
world... like raindrops
to the sea.

²Source: ChainLink Research, Passive UHF RFID Market 2015-2018

The success of RAIN RFID products and solutions stems from the highly valued features and benefits this technology brings to the IoT today:

- Mature RAIN RFID tag and reader infrastructure offers greater availability and variety plus low costs
- Value of auto-ID versus IP-enabled assets for lower maintenance and no power source requirements
- Attaching or embedding information to an asset to create 'intelligent things'
- Authentication of products, brands, and processes.

RAIN RFID uses zero-power, low-cost radio tags to provide each tagged item with a unique identifier, and in some cases the ability to store extra data. RAIN RFID tags require no battery, offer long life, and have variable read range from just a few millimeters to more than 15 meters.

The RAIN RFID system makes it particularly well-suited to connecting everyday things, thereby allowing inclusion of many more 'things' in the IoT.

In fact, a RAIN RFID tag was named the Internet of Things 2015 Product of the Year at the Embedded Systems Conference [ACE Awards](#), beating many new products from other technologies.³



SIMPLY EFFICIENT

With the rise of omnichannel marketing and customer expectations for expedient service, speed and efficiency can make the difference between boom and bust. For example, consider the task of quickly and accurately locating a particular item in a fulfillment warehouse full of inventory. While some technologies use always-on, networked elements that are constantly transmitting their location, the high cost and limited capacity of those solutions make them unrealistic for many applications.

Alternatively, a RAIN RFID solution allows each item to be tracked as it moves throughout the warehouse using stationary RAIN RFID readers, routinely recording the time and location of each item as it passes, without requiring the help of personnel or a power source for each of the many passive RAIN RFID tags being tracked. This system allows a much higher number of items to be connected in the network more efficiently.

Likewise, consider the case of a consumer searching for a particular pair of jeans. If they are unable to find their favorite brand in the right size on the shelf, the retailer likely will lose a sale. But suppose the pair they

³"RFID Chip Tags IoT Award"; EE Times, July 22, 2015: www.eetimes.com/document.asp?doc_id=1327125



RAIN RFID networks offer:

- Low cost
- Long range
- No batteries
- Unlimited life
- Unique identifier
- No line-of-sight required

are seeking is actually two shelves over... or perhaps there are more in the back room but the sales person doesn't realize that.

Of course, it would not be feasible for a retailer to install Wi-Fi tags in their jeans. However, by using RAIN RFID, the store could have an instant notification of the jeans being removed from the shelf, being misplaced on the wrong shelf, or being sold. This is the reason that retailer Macy's has used RAIN RFID to track shoes in some of their stores, reporting an [increase in sales](#) of 7 percent.⁴

Beyond industrial and commercial uses, the RAIN RFID Alliance is working to enable consumers to make use of the technology as well. The integration of RAIN RFID readers into smartphones will allow consumers to read the tags that are on items they would like to

purchase – and have already purchased – whether they are shopping for apparel and household goods, or they want to authenticate luxury brand items that are often counterfeited.

BRAVE NEW WORLD OF OPPORTUNITY

Growth of the Internet of Things is forecast to far exceed that of other connected devices. Estimates predict the resulting economic value-add that businesses will derive may be as high as \$1.9 trillion, with adoption being led by retail, manufacturing and healthcare.⁵

While this is an exciting forecast, most analysts have not factored in UHF RFID technologies in their predictions for the future of IoT. The latest forecast from RAIN RFID Alliance liaison member IDTechEx, based on market data collected from RAIN Alliance manufacturers, anticipates sales of 18.9 billion RAIN RFID tags for 2020.⁶

As the number of connected things grows exponentially in the IoT, businesses and consumers alike will reap the benefits of improved productivity, security, efficiency, and risk mitigation. RAIN RFID, as an essential building block of the IoT, will not only enable many new applications and business models, but more importantly, will make them affordable and practical.

⁴“What happened to the “Things”; Cisco Blog, June 19, 2015: <http://blogs.cisco.com/perspectives/what-happened-to-the-things>

⁵“Forecast: The Internet of Things, Worldwide, 2013”; Gartner, Inc. Research Report; Dec. 12, 2013: www.gartner.com/newsroom/id/2636073

⁶IDTechEX RFID Forecasts, Players and Opportunities 2014-2024.

ABOUT RAIN RFID ALLIANCE

The RAIN RFID Alliance is an organization founded in April 2014 to promote awareness, increase education and support the universal adoption of UHF RFID technology. RAIN members are manufacturers, distributors, resellers and researchers working with the EPC Gen2 UHF RFID specification, incorporated into the IS/IEC 18000-63 standard.

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. For more information, visit www.RAINRFID.org.

The RAIN RFID Alliance is part of AIM Global, the worldwide authority on automatic identification, data collection and networking in a mobile environment. AIM is dedicated to accelerating the growth and use of Automatic Identification and Mobility technologies and services around the world. For more information, visit www.aimglobal.org.



RAIN RFID

One Landmark North
20399 Rte 19
Cranberry Twp., PA 16066

If you're interested in having your company become a member of RAIN or have any questions about the RAIN alliance, please send RAIN an e-mail: info@rainrfid.org