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A SATO Guide:

How to develop and implement an effective RFID strategy for your customer

RFID by SATO SOLUTIONS

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Introduction: The latest in RFID technology

Radio Frequency Identification ('RFID') technology has changed dramatically in the last few decades. Since its initial discovery in the 1920s, through to invention in the 1940s and to the first commercialisation expansion in the 1980s, RFID has swiftly become a commonplace technology helping businesses track and trace goods. But it wasn't until the early 2000s when RFID became much more accurate and affordable for businesses across all industries, and even then, it was scarcely used to its full potential. While the benefits of using RFID technology were clear, there was a distinct lack of direction and strategic planning that often resulted in poor project implementation.

In the last ten years, RFID technology has seen an upswing in adoption rates by businesses, particularly those in retail supply chains. According to the latest insight from Accenture, only 34% of North American retail companies had adopted RFID by 2014[1]. In 2020, that figure rose to 93%, with 47% of retailers using RFID to its full advantage, 37% in the implementation process and 8% piloting it[1]. In contrast, European retailers haven't been as quick off the mark, with only 77% considering or using the technology[1]. However, the Covid-19 pandemic has certainly had a direct impact on RFID usage, with 46% of the survey's respondents saying they had focused on the technology much more in recent months.

While the surge in adoption rates has been partly down to the impact of the pandemic on supply chains, the average cost of an RFID tag has fallen by 80% in the last decade, with read accuracy doubling, range accuracy quadrupled, and the price of an RFID reader dropping by nearly 50%[2]. Due to this, RFID encompasses more than just inventory track and trace, the technology is now being used to create detection zones around vehicles to promote health and safety of employees in the workplace[3], alongside seeing success as part of an RFID-based cashless payment system to prevent queues and the handling of money at music festivals following Covid-19[4]. Even a Spanish bookstore has found RFID technology can provide a unique immersive reading experience for its customers by delivering automated access of content and self-service purchasing[5].

The possibilities of RFID technology are endless. Yet without an effective and strategic plan in place, businesses can leave themselves vulnerable to poor implementation and execution. To help you understand how to develop a robust RFID strategy for your customer, this whitepaper advises you on how to identify the project needs by defining the process, key criteria and best technology to use for the job at hand.



Step 1: Identify project needs and define the process

Before we recommend an RFID solution, we must first identify whether the business would like to implement the technology as part of a point solution, or an infrastructure development. The former does exactly what it says on the tin, it 'points to' a specific object or area to help restrict access, track its location, or automate its progress through the supply chain. Conversely, an infrastructure solution operates as a platform to help the business launch future deployments that will generate additional value. This could mean using a digital twin system to analyse and monitor real-time data to help prevent downtime or develop new opportunities through visualisations.

Here are some typical scenarios to consider:

- **A 'Point' Solution**
  - Does the business want an ideal way to track materials, finished goods or people through specific points?
  - Is it often losing or misplacing items after they leave the distribution centre or manufacturing area?
  - Does it need to seamlessly integrate with an ERP, MES or WMS system?
  - Does the current RFID system need to be upgraded or is it not currently fit for purpose?

- **An 'Infrastructure' Solution**
  - Does the business want to support multiple applications and integrate into multiple backend systems?
  - Does the business need to be able to upscale business operations and adapt it for future growth?
  - Is it using many mobile or portable devices that need to be tracked for data collection purposes?
  - Is it seeking to drive digital transformation, innovation and performance through data monitoring and analysis?

In addition to defining the solution required, businesses also need to think about the bigger picture. This means that all stakeholders across the company must be involved during the decision-making process. From manufacturing and engineering to those involved at a later stage in supply chain, such as sales and marketing, cross-functional teams need educating on what others are doing in the industry, understand the benefits and the ROI and pinpoint whether they line up with the customer's requirements.

Step 2: Specify key criteria

Once the business has decided on a point-based or infrastructure solution, it is now time to map out the common processes and draw a list of key requirements for the project. It is a good idea to take note of the current system. For example, is the business manually entering data into a warehouse management system, or is it checking off tick-lists from the back of a store and using Excel spreadsheets to keep track of stock?

It is also worth explaining the difference between an active RFID solution and a passive one, so the business can weigh up the benefits of each. Ultimately though, the business needs guiding towards a solution that is the most cost-effective, returns the most on investment in the fastest time, and is the easiest to integrate into the current operations.

Fortunately, the simple RFID criteria checklist from SATO serves as a handy tool when discussing requirements.

1. Data Collection

a) What data needs to be collected?

b) Where does it need to be collected?

c) Who needs to have access to the data?

d) What alerts need to be sent, how often and to what department?

e) Does the data need to be cleaned, or do you have access to the master files and are these up to date and accurate?

2. What are the common pain points or problem areas consistently seen across the business?

- ☐ Regular misplacement or loss of materials / items
- ☐ Lack of education, knowledge or training across operations
- ☐ Hardware malfunctions or breakdowns
- ☐ Software errors in regards to data transference or inaccuracies through labelling processes
- ☐ Internal parts have various or inconsistent numbers, making them difficult to track
- ☐ Employee health and safety at risk due to mismanagement of technology solutions
- ☐ Other

3. Software, Hardware & System Integration

a) What software, hardware and applications do you currently use?

b) Do you require any customisation of backend systems?

c) Do you have any preference on hardware and software brand and is integration required?

d) Do you require the solution to integrate with a GPS tracking system?

e) Is there anything else that we should know?

4. Project Team

- ☐ Have you identified who will be in charge of prioritising project pilots, deployments and choosing vendors?
- ☐ Have you identified who be in responsible for the IT issues or liaising with the outsourced IT company?
- ☐ Do you have a global RFID policy in place, or do you have plans to create one?
- ☐ Do you know who is responsible for training and educating employees on the new RFID process?
- ☐ Do you know who is your main point of call for technical support should an issue arise?

5. Active and/or Passive RFID

Passive:

- ☐ Do you need RFID tags for access control, file tracking, supply chain management and smart labels?
- ☐ Do the tags need to withstand extreme temperatures or rugged outdoor environments?
- ☐ Do the tags need to be embedded within a small area or crevice for additional flexibility?

Active:

- ☐ Do you need RFID tags to accurately track the real-time location of assets in high-speed environments?
- ☐ Do you require a long read range?
- ☐ Do you require increased capabilities on the tag, such as GPS or the use of sensors?
- ☐ Do the tags need to withstand extreme temperatures or rugged outdoor environments?



Step 3: Choose the right technology for the best ROI

At SATO, we work with our Partners to make sure they are purchasing the best solution for their customer's project. We have a wide range of RFID-enabled label printers – from desktop to mobile and industrial to intelligent – that help save operators time and reduce costs in healthcare, retail, food, restaurant, manufacturing, automotive and the transport and logistics industries. Each printer comes with its own unique set of features and may incorporate additional advanced technology like application enabled printing (AEP), SATO Online Services (SOS) in addition to RFID.

Below is a quick overview of our latest printer technology, their advantages, and an example of how they may benefit a customer's environment.

CL4NX Plus & CL6NX Plus

The CL4NX Plus & CL6NX Plus Series are highly advanced industrial thermal printers and ideal for a variety of industries, including automotive, transport & logistics, manufacturing, retail and more. Featuring best-in-class ribbon core and increased precision for micro label applications, this series also comes with RFID functionality alongside AEP.

The series is capable of printing speeds up to:

- CL4NX Plus > 355mm/s (14ips) in 203/305 dpi and 152mm/s (6ips) in 609 dpi
- CL6NX Plus > 254mm/s (10ips) in 203 dpi and 203mm/s (8ips) in 305 dpi

Advantages:

- Maximum uptime performance with PureLine™ platen rollers and Smart Head to track, trace and monitor print head usage
- Durable and functional design from its metal casing with bi-fold cover
- Intuitive operation with LED indicators, video guidance and full colour LCD screen
- Easy setup and maintenance with tool-less platen replacement
- Caters for multi-lingual workforces
- Comes with AEP and SOS support
- Fully equipped with RFID label printing capabilities

Customer Use Case Scenario Industry: Manufacturing

With an average of 7,000 steel pallets in stock and thousands delivered weekly, this company reprocesses steel coils into cut-to-size plates for its customers. To deliver accurate pallet registration and automatic location and load control, they required an RFID-enabled track and trace solution that could provide an up-to-date overview of its logistical operations. Installing the CL4NX RFID-enabled printer has since replaced the company's traditional barcode scanners by implementing a real-time detection and localisation system that is linked to its existing warehouse management system. With a fully automated system, the company saved time, improved delivery accuracy and increased efficiency.



CT4-LX

A compact 4-inch printer with powerful performance and advanced support for barcode symbologies, the CT4-LX comes with RFID encoding and AEP as standard. It's great for the healthcare, retail, food and manufacturing industries due to its small space-saving size and eco-friendly printing with zero label waste.

Capable of printing speeds up to:

- 203dpi > 203mm/s (8ips)
- 305dpi > 305mm/s (10ips)

In addition to its excellent capabilities, the CT4-LX also comes with SATO RF Analyse (SRA), which enables the user to easily move the antenna to measure and set the RFID label configuration settings. As a result, users can re-measure configuration settings quickly according to each specific production batch that requires a different or unique RFID label. Previously, users would need to send the printer away to be inspected, but with SRA, they can significantly reduce downtime and increase productivity.

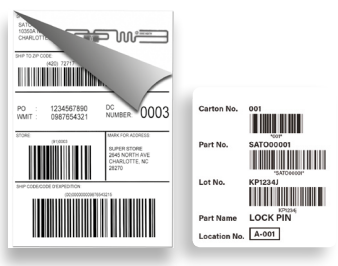


Advantages:

- Efficient label production, minimising waste
- Integrates with existing devices for ultimate flexibility
- Reduced desk-space demands with convenient printer installation via its front cover open button
- Ideal for operation across geographic operations with multi-language support
- Onboard guidance videos to speed up troubleshooting and minimise downtime
- Comes with AEP and SOS support
- Fully equipped with RFID printing capabilities

Customer Use Case Scenario Industry: Manufacturing

This global retailer was often misplacing or losing items due to manual errors between the distribution centre and the store. By using RFID labels based on a scanned barcode via the CT4-LX printer, the product data is stored directly into their cloud database. Not only does this reduce supply chain complexity since there is no middleware, but it also minimises the risk for human error by decreasing manual input through the scanner. An easy and quick way to implement RFID technology and reduce the total cost of ownership.





S84-EX & S86-EX

Covering the need for 4-inch or 6-inch printing applications, the S84-EX and S86-EX direct thermal printers can print both text and barcodes on the surface of RFID tags and labels, alongside encoding RFID data into them. Working best with the healthcare, food, automotive, manufacturing and logistics industries.

Capable of printing speeds up to:

- S84-ex >406.4mm/s (16ips) in 203 dpi, 355.6mm/s (14ips) in 305 dpi and 152.4mm/s (6ips) in 609 dpi
- S86-ex > 355.6mm/s (14ips) in 203 dpi and 304.8mm/s (12ips) in 305 dpi

Advantages:

- Simple standalone mode providing independent operation via printer key and display
- Increased connectivity with multiple interfaces to support both legacy and future host environments
- Ease of maintenance with excellent print head and roller replacement with rear service access
- Ideal for operation across geographic operations with multi-language support
- Environmentally friendly with a ribbon saver model to reduce the use of thermal transfer ribbon
- Fully equipped with RFID printing capabilities



Step 4: Start small, think big

After having specified a customer's key criteria and chosen the best technology for the project, the next part of delivering an effective RFID strategy is to begin implementation from one location only. Here, we need to start small but think big.

Start by presenting the customer with a clear picture of the RFID project from the beginning, perhaps splitting the implementation into phases for testing and configuration purposes. The first phase may be to install the RFID printers and then integrate them with a new ERP system or an existing MES or WMS application. For instance, if integration with an ERP system is required, we would need to ensure it was able to instruct the SATO device to print an RFID label containing product information and a QR code.

In the next phase, the customer may want to register the data to analyse and monitor it within a separate software application. They may also want to localise the data for inventory purposes. Here, education and training are important, so make sure each employee knows how to use the new system before it is implemented.

In the final phase, the customer may want to install RFID-enabled trackers on gates to display proof of goods coming in and out of the distribution centre or manufacturing facility.

Depending on the project complexity, we will need to consider whether an active RFID tag is used here (rather than a passive) to enable long read ranges and resist extreme weather conditions.

When each phase of the project is complete, it is imperative that the deployment is documented based on how it was achieved, what RFID hardware was used (printers, tags, readers etc), the software that was used, if there were any challenges and how they were overcome, and finally what can be done to improve the process next time. If documented correctly, this will significantly reduce the time spent by the team when the project is rolled out in another location.

In summary

An RFID project is a large undertaking for any business, but when it is implemented correctly the results often speak for themselves. To return full circle, retailers that have fully adopted RFID technologies are now reporting more than 10% return on investment compared to 9.2% recorded in 2018[1]. And, when businesses begin to 'layer' RFID to deliver an omnichannel experience with source tagging through the supply chain, they are seeing a much larger ROI (approximately 16-20%)[1].

The greatest RFID solutions require ceaseless creativity and innovation. Fortunately, SATO is best placed to support Partners in this next generation thinking.



References

1. Accenture, **A new era for RFID in retail**, *2021*.
2. McKinsey, **RFID's renaissance in retail**, *May 2021*.
3. International Vehicle Technology, **Brigade Electronics launces RFID ZoneSafe Solution**, *July 2021*.
4. RFID Journal, **RFID helps clubbers party like there's no Covid-19**, *May 2021*.
5. RFID Journal, **RFID turns the page for immersive bookstore experience**, *April 2021*.

For more information on our RFID-enabled label printers, please contact your local SATO representative via our website: satoeurope.com/contact/