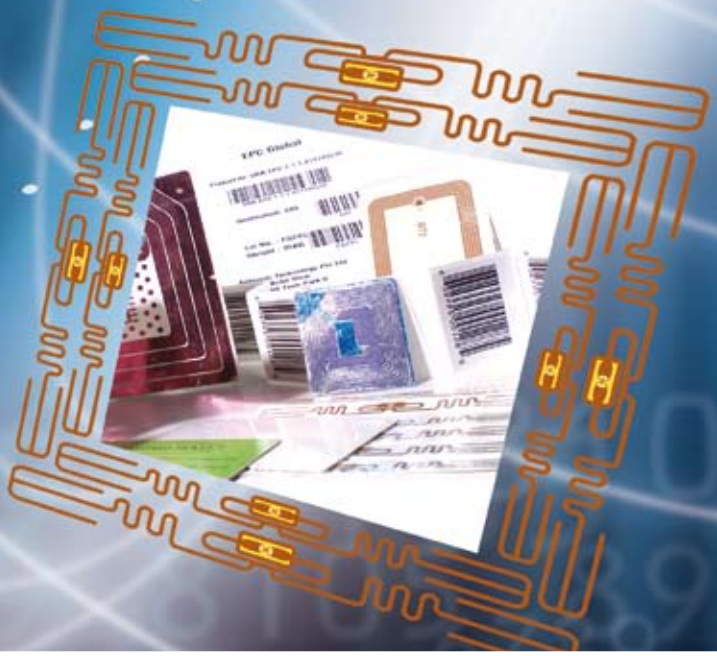
GS1 Australia

CSIRO

EPC Network™ Australian Demonstrator Project Report



AUSTRALIAN FOOD AND GROCERY COUNCIL

CAPILANO

CHEP

Gillette

LINFOX

Metcash TRADING LIMITED AUSTRALASIA

P&G

NUGAN ESTATE

VeriSign

VISY

Sun microsystems

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Acknowledgements

The National Demonstrator Project has been successful through the collaborative efforts of government, organisations, companies and people who all brought vision, expertise, commitment, enthusiasm and resources to this project.

The consortium would like to acknowledge the contribution and commitment of all participants.

Special acknowledgement is made of the following:

- The federal government's Department of Communications, Information Technology and the Arts (DCITA) generously gave the consortium a $200,000 grant from the Department Information Technology On Line (ITOL) fund, making the pilot project possible.

- Members of the consortium included:
  - CHEP
  - Gillette
  - Linfox
  - Capilano Honey
  - VeriSign
  - Sun Microsystem
  - Visy
  - Procter & Gamble
  - Metcash
  - Nugan Estate
  - CSIRO
  - GS1 Australia (formerly known as EAN Australia)
  - The Australian Food and Grocery Council

The project would not have been successful without their employees' enthusiastic participation, professionalism and support as well as their generously shared expertise in every field, from analysis and implementation to final evaluation.

The consortium also would like to thank Alien Technology, Paxar and Hyro – the companies supplying hardware and services for the project.

Speaking a global language

Executive Summary

The National Demonstrator Project was an opportunity to demonstrate the benefits of Radio Frequency Identification (RFID) technology and the use of the entire EPC Network™ in the supply chain.

The project gave the consortium of manufacturers, retailers and other organisations in the fast-moving consumer goods sector the opportunity to trial RFID technology in Australia under local conditions. The project's reach across an entire supply chain made it the first of its kind in the world.

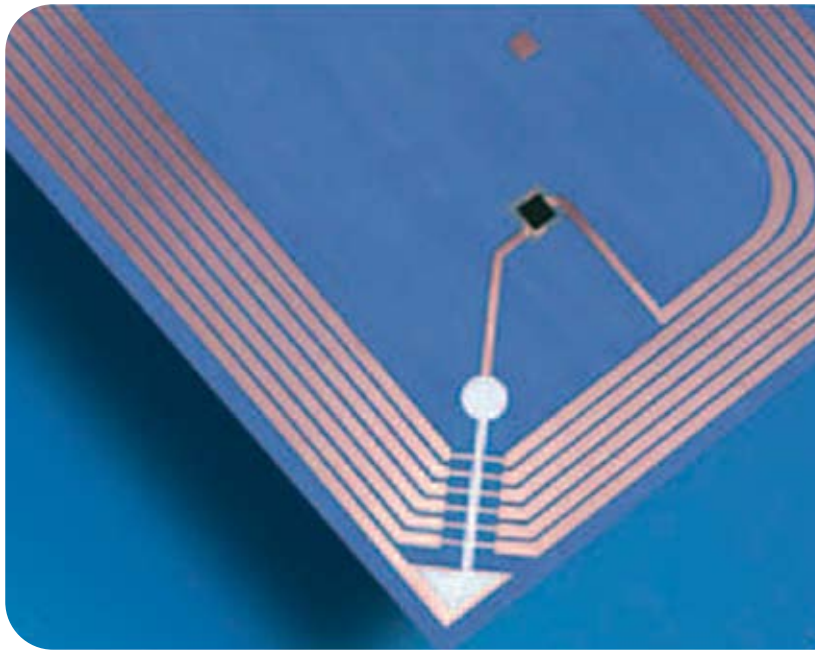
The project demonstrated benefits for all partners within the supply chain, adding to what is already understood about the savings for retailers. The sharing of learnings also meant savings in time and money for Australian companies.

The pilot involved tracking the exchange of ownership and the movement of products through the supply chain from manufacturer to retailer. Its scope was to demonstrate that the EPC Network could deliver efficiencies right along the supply chain with improved visibility being of benefit to all, not just to direct trading partners.

The National Demonstrator Project successfully demonstrated that:

- A single set of global standards reduces time and saves money
- Cross-functional teams make implementation easier and give participants greater benefits
- Internal knowledge is critical to success
- The EPC Network's benefits apply to all organisations and increase with greater trading partner participation

The consortium recommended that any future trials should develop detailed use cases at each point and ensure the system is designed and installed by partners with RFID knowledge and experience.



The pilot established that the EPC Network could be implemented and that a single set of global standards is key to reducing costs and providing additional benefits through greater efficiencies, visibility, information timeliness and accuracy. The project highlighted potential business benefits for each type of participant within the consortium.

Finally, participating in the pilot gave consortium companies real life experience with RFID. This means they are well prepared should RFID mandates become a reality and have identified business benefit areas for their companies.

Technology Overview

What is RFID and the EPC Network™

RFID

Radio frequency identification, or RFID, is a term for the technology that uses radio waves to automatically identify objects.

The aim of most RFID systems is to increase efficiency throughout the supply chain. Combining RFID with databases, networked via the internet, makes it easier to collect data and item movement information, thus providing greater visibility and, in turn, more effective supply chain management.

First created during World War II to differentiate between friendly and enemy aircraft, RFID has been around for more than 60 years but has not been widely adopted in the past due to lack of global standards and cost. Now, with the application of global standards and a reduction in the cost of systems, RFID is being increasingly used in new applications.

RFID systems have an advantage over bar code systems as many tags can be read at one time and they do not require visible line-of-sight. A scanner has to 'see' a bar code to read it. RFID tags can be read as long as they are within range of a reader.

How RFID works

An RFID tag consists of a microchip attached to an antenna. The microchip stores a serial number that identifies an object and perhaps contains other information, while the antenna enables the chip to transmit the information to a reader. The reader converts the radio waves reflected back from the RFID tag into digital information, which can then be passed on to computers that can use the data.

Tags can be either passive or active. Passive tags have no internal power source and are only able to be read when powered by a reader. Active tags have an internal power source and can return signals over a longer distance. They may also have extra storage capacity and can incorporate sensor capabilities.

Typically, RFID tags operate at different radio frequencies, each of which has different characteristics:

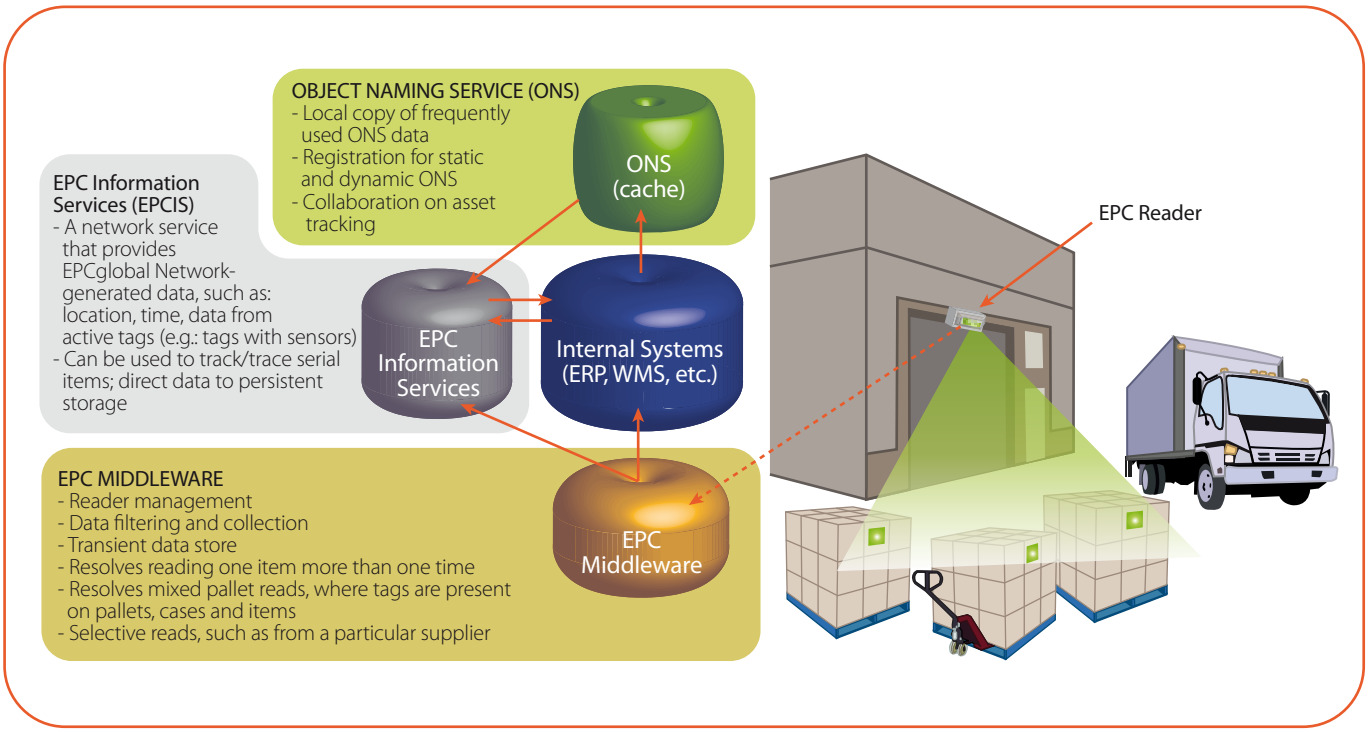
- Low Frequency (LF 125 Khz) has a low data rate
- High Frequency (HF 13.56 Mhz) has a reasonable data rate but can only be read over a short distance
- Ultra High Frequency (UHF 860 – 960 Mhz) generally can be read at a greater distance and has a good data rate, making it most suitable for supply chain applications

The EPC Network™

When RFID tags are attached to items moving through the supply chain, they can be read at various points. For example, tags on both the products and pallets can be scanned as the unit loads are moved through a dock. When this information is transmitted back to a database on a computer, companies can share information about the location of individual products anywhere in the supply chain with both their customers and suppliers. This visibility and automation is what makes RFID such a potentially powerful technology.

The EPC Network standards are designed to formulate the basis for global adoption of RFID and the methodology for capturing, storing, sharing and viewing data. The Network is made up of the following components:

1. **RFID hardware standards**
   a. The communication between the readers and the tags – air interface protocol
   b. Reader communications and management
2. **IT systems standards**
   a. EPC Information Services (EPCIS) database standards for storing, sharing and sourcing EPC event data
   b. Application Level Events (ALE) filtering software to filter out EPC/RFID tag reads to ensure only meaningful and relevant event information gets passed up to the EPCIS database
   c. Object Naming Service (ONS), which serves a similar function to the Internet's Domain Naming Service (DNS) and allows users to find information related to a specific EPC number
3. **Data standards**
   a. Tag Data Standards provide a standard numbering structuring for uniquely identifying every specific item and a methodology for encoding that information on the tag.



Above: EPC Network components in action.

Introduction

The rationale for the project

RFID technology has begun to attract much attention globally. In the United States, Wal-Mart, Target, Best Buys, Albertsons and the Department of Defence are alreadymandating the use of EPC tags by their suppliers. Within Europe, requests coming from Metro, Tesco and many other major retailers. In Asia too, we are seeing a rapid increase in the involvement of retailers and manufacturers alike.

For GS1 Australia, the National Demonstrator Project was an opportunity to demonstrate the benefits of both RFID technology and the EPC Network. Sharing the project's learnings also allowed GS1 to save Australian companies time and money.

The entire consortium, including CSIRO and GS1 Australia, felt that it was important to gain learnings locally as some of the drivers in Australia may be different from overseas.

"We wanted to involve an entire supply chain as this had not been done before. Much of the focus and information currently available relates to retailers' successful implementation of EPC/RFID systems but it was important to demonstrate that there were also benefits for manufacturers," said Fiona Wilson - GS1 Australia General Manager - Standards Development.

A brief history of the project's formation

CSIRO approached GS1 Australia to sponsor this world-first project. Together, the two organisations invited the involvement of key companies within an Australian supply chain. They also approached the federal government's Department of Communications, Information Technology and the Arts (DCITA) and, in June 2005, received a grant from the department's Information Technology On Line (ITOL) fund.

The project involved companies from across the fast moving consumer goods (FMCG) supply chain, including Metcash, Gillette, Procter & Gamble, Nugan Estate, Capilano Honey, Visy Industries, Linfox, CHEP, VeriSign, Sun Microsystems and the Australian Food & Grocery Council (AFGC). Not only was it critical to get participants from an entire supply chain, it was important that small to medium enterprises (SMEs) were involved as well as large Australian companies. A consortium, led by CSIRO and GS1 Australia and including representatives from all companies, was formed to oversee the project.

The consortium wanted to examine all elements of the EPCglobal Network, not just RFID tags and readers, across seven sites. It involved both the exchange of ownership and the tracking of the movements of cartons of products, the physical pallets that they were shipped on and the individual shipments or unit loads.

Who got involved and why

GS1 Australia

For GS1 Australia, the National Demonstrator Project was an opportunity to demonstrate each element of the EPCglobal Network.

"This is our opportunity to demonstrate the benefits of the EPCglobal network for different types of trading partners linked in the supply chain," GS1 Australia General Manager - Standards Development, Fiona Wilson said at the launch of the project.

"We will be able to see the implementation and benefits of the new technology and standards, not just for large companies, but for SMEs, as well. Everyone will have the chance to absorb the implications and learnings from the National Demonstrator Project before mandates become a reality for Australia."

CSIRO

CSIRO's Dr John Mo said the project would demonstrate how electronic information could help companies to do business globally.

"Through this project, we show potential areas of benefit and the readiness of the technology to the Australian business community," he said.

Gillette

Manufacturer Gillette has been a global leader in EPC development and this project was an opportunity for it to support an Australian industry EPC project, according to Bruce Grant, Gillette Australia's EPC/RFID project manager.

"For us, it was an opportunity to develop the EPC ecosystem in Australia as well as to demonstrate EPC benefits to the retail sector," he said.

"This project would also give Gillette an opportunity to build Australian EPC competency and to stay at the leading edge of the EPC curve. It also meant Gillette would be able to uncover new learning opportunities with EPC, which could then be used to improve our business process."

Procter & Gamble

Globally, Procter & Gamble has been involved in testing RFID technology to replace bar codes for tracking goods. Procter & Gamble Australia's Supply Chain Logistics Manager Allen Lowe said: "It was important to Procter & Gamble to stay at the forefront of developments in RFID technology and to see how it could be used within our industry. This trial gave us an opportunity to do this in Australia."

CHEP

Murray Fane, Information Systems Manager for CHEP, said his business was unique in that its equipment moved through the entire supply chain.

"The major draw card for us to join the National Demonstrator Project was the opportunity to investigate the benefits of RFID enabled, standards based, data sharing throughout the supply chain," he said.

"Although CHEP has been involved globally for several years in RFID, particularly with the research and testing of readers and tags in our Orlando Innovation Centre and the commercial supply of RFID enabled pallets, there had only been limited research in full-scale supply chain tracking. Our work with Procter & Gamble and Gillette in Brazil did track tagged pallets between trading partners but the National Demonstrator Project takes this further with the introduction of EPC standards and the data sharing made available through VeriSign's web portal."

"This project had the potential to show how shared tracking from the start to the end of the entire supply process could provide information that can be used by all parties to improve delivery efficiency. That was our goal."

Linfox

Linfox Logistics Planning Manager Michael Fraser said involvement in the trial meant Linfox could stay close to an emerging technology with the potential to deliver business benefits to its customers.

"Business should be able to gain greater insight into the business benefits involved in sharing RFID data captured and shared across the EPC Network," he said.

"We will use the trial experiences to begin building an RFID roadmap anticipating customer-market expectation that we are technically agile enough to provide the type of integrated solutions they may come to need should RFID become as pervasive as we anticipate."

Introduction

VeriSign

VeriSign's involvement in the project stemmed from its experience in providing the critical building blocks for EPC compliant solutions globally, according to Ben Armstrong, Business Manager, VeriSign Information Services.

"The project is leveraging VeriSign's EPC compliant EPCIS and ONS components, as well as a visualisation tool to allow participants to track and trace pallets, shipments and cartons between project participants," he said.

"VeriSign will demonstrate that EPC compliant RFID solutions add negligible cost to an RFID solution, and indeed solve some fundamental issues associated with multi-party commerce that are inherent with a real supply chain."

Visy

Packaging manufacturer Visy got involved in the project to maintain a lead position on the use of RFID in Australia, according to Visy Manufacturing Solution Manager Andrew Stuart.

"We wanted to gain expertise using the latest versions of the technology as well as to experience the integration of the technology along the supply chain including vendors and customers," he said.

Metcash

For Metcash, involvement in the project was important to build an understanding of the RFID technology and what it could do for its operations, according to Metcash's National business Development Manager Dominic Wong.

Sun Microsystems

Sun became involved in the project as a means to help "demonstrate the potential benefits that the EPCglobal Network could bring to companies along the whole supply chain process," said Daniel Cifuentes, Systems Engineer, Sun Microsystems Australia.

Sun believes the "Network is the computer" and RFID is the last mile of connectivity as it enables anything to become connected and relevant to the network.

Capilano

Capilano's IT Manager, Mark Noake, said while the honey supplier was invited onto the project to offer the perspective of a small to medium enterprise, the project was an opportunity to be involved in the early stages of development of new technology.

"Normally, most small companies would not have the chance to be involved in such a project with large companies," he said.

Australian Food and Grocery Council

The Australian Food and Grocery Council (AFGC) has been actively involved in Australian's EPC/RFID development since 2004 with the publication of its report From Barcode to Electronic Code, which detailed the Australasian market's readiness for EPC adoption.

"Our participation continues with involvement in the National Demonstrator Project," said Samantha Blake, AFGC's Assistant Director Supply Chain.

"The pilot provides an opportunity for the AFGC to evaluate RFID enabled uses along the supply chain whilst representing the interests of food and grocery manufacturers and acting as an information conduit to them when appropriate."

Nugan Estate

Tiffany Nugan, Nugan Estate's National Sales Manager, said Nugan Estate was invited onto the project to provide feedback from an SME viewpoint.

"We were keen to participate as potentially this technology could allow us and other suppliers to track our stock through the supply chain, which would be extremely beneficial. This was an opportunity to learn about it first hand," she said.

Key Pilot Objectives

The key objectives for the National Demonstrator Project were to demonstrate the principle of the EPC Network by implementing it across an entire supply chain and, additionally, to show that the increased visibility could deliver business benefits for all participants in the supply chain. Specifically, the aims of the project were to:

Show that the EPC Network could deliver benefits to the entire supply chain over and above the benefits that could be achieved by simply introducing RFID.

Most implementations of the EPC Network involve only the tags and readers with communications between the trading partners being generally one-to-one. An example of this is a retailer who is communicating only with the brand owner or manufacturer. GS1 Australia wanted to demonstrate that the EPC Network could deliver efficiencies right along the supply chain with improved visibility being of benefit to all, not just to direct trading partners.

Identify business processes and potential efficiency gains for each type of participant.

The drivers for each type of participant within a supply chain may be different as business processes and operations vary depending on the type of organisation. Each type of organisation will be able to analyse the technology and identify areas within their business which would be the most likely areas to achieve the greatest benefit from the use of the EPC Network.

Encourage Australian companies to get involved because EPC/RFID will deliver business benefits - rather than wait for mandates.

Big global retailers and organisations such as Wal-Mart, the United States Department of Defense, Tesco, Metro, Albertsons, Best Buys have made RFID tags mandatory for their suppliers. Most of the suppliers to these organisations are simply applying RFID tags to their products as they ship them to their customers. In the race to comply, these suppliers have borne the cost of implementing this system without applying the technology througout the supply chain to benefit their own company. GS1 Australia wanted Australian companies to learn from the pilot and to be able to implement the technology to deliver benefit before any mandates are made.

Provide information related to improvements in efficiencies through use of the EPC Network.

The introduction of the EPC Network, by enabling greater visibility, automation and collaboration between trading partners, provides a platform to improve many business processes. Benefits could come from applications such as improved replenishment, inventory and promotions management, better traceability as well as providing the ability to distinguish counterfeit products from the genuine article. These are extremely important to not only the FMCG supply chain but many other industry verticals.

Provide information about increased efficiencies and accuracy through this new method of automatic identification.

Technology that automates product identification speeds up the movement of products through the supply chain, as scanning is easier and quicker once automated. Also, because there is no requirement for manual scanning, more read points can be established, leading to greater visibility of product locations.

Pilot Process

Pilot process

With objectives set, the next step was to ensure the information gathered and contained within the network would be made available and thus would enable companies to assess the use of the EPC Network within their environment. With this agreed to, the consortium then set about the process of establishing the pilot.

Fiona Wilson, GS1 Australia General Manager – Standards Development, said all members of the consortium contributed greatly to the development and design of the pilot.

"It was very important to the project to have the participation of large and small-medium organisations. While not all consortium companies installed RFID hardware within their supply chain, their perspective was vital to the project," she said.

"Gillette, Procter & Gamble, Visy, Linfox, CHEP and Metcash were selected to set-up EPC/RFID 'live' sites to capture the exchange of product ownership throughout the supply chain pilot."

Scope

- To show the EPC Network in real life by tracking the movement of goods and, more particularly, the exchange of ownership, between each of the physical sites.
- Track the movement of trade items (at carton level), physical assets (pallets) and also the unit loads (pallets loaded with cartons) between each site.
- Read points at each site where goods were received, dispatched and where unit loads (shipments) were collated.

Pilot Process

RFID set-up

- CSIRO undertook radio frequency analysis on each site to assess whether other equipment, which may already be in use on the site, would affect RFID readers. CSIRO also designed the layout of the RFID readers and antennas at each portal to maximise the effectiveness of the read rate.
- The consortium formed an equipment subgroup to specify requirements for hardware and to assess quotations and then select and purchase hardware.
  - Alien ALR-9640 – Smartenna's were used at the end of production lines
  - Alien ALR-9780 RFID readers were used for dock door portals, smart shelf, shrink wrapping and other read points
  - Psion Teklogix 7535 hand held readers were used on both CHEP sites
  - RFID tags used were Alien Class 1
  - RFID labels were supplied by Paxar
- As Procter & Gamble had unique site requirements, their system and RFID antenna was custom designed and built by CSIRO.
- Installation and testing of read points was performed by CSIRO in conjunction with site owners.
- Gillette and Procter & Gamble tested selected products to determine the best location for the tags to optimise the read rates, the tag's positioning on a product can greatly affect the success of the reading.

IT infrastructure

- Detailed use cases were established at each site specifying both the physical process and the information required at each read point.
- Sun Microsystems designed the middleware and user interfaces to meet the business requirements that had been gathered by the individual site owners.
- VeriSign set up entries in the global ONS repository and provided EPCIS services for storing product attribute, containment and observation information in relation to pallets, shipments and cartons of product.
- VeriSign also created a user portal to allow all participants to view the movement of the products and see associations with other products through the supply chain.
- CHEP and Visy Industries used some existing infrastructure and internal expertise to build middleware to transfer captured event reads to Verisign's hosted EPCIS databases.

Products tracked

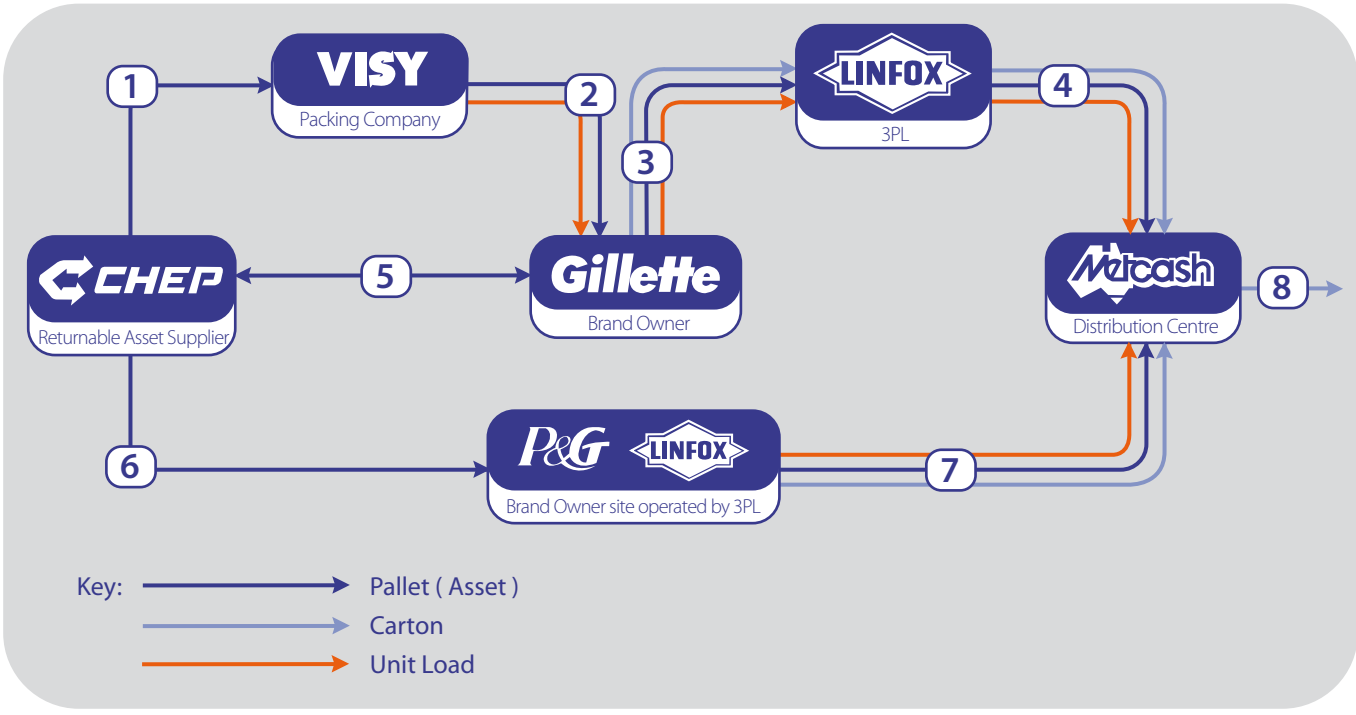
- CHEP tagged specially marked pallets for use in the trial.
- Gillette trade items used were Mach3 razor blades and Duracell batteries.
- Procter & Gamble products used were four varieties of Pantene shampoo and conditioner and Metamucil.

Additional site-specific tasks included consulting with operational staff, on-site IT support, power and cabling and, in some cases, involvement across the business.

Below: RFID tagged products received at Gillette.

Physical flow of items

1. CHEP dispatched RFID tagged pallets to Visy Industries. The pallets were read as they left the Visy site and the receipt of the pallets was also recorded as they arrived at Visy Industries.
2. Visy placed blank (untagged) cartons on the pallets, applied an RFID enabled shipment label and dispatched the shipment to Gillette. The physical pallet and shipment tag were captured as they were dispatched from Visy and then captured when they were received into the Gillette site.
3. Gillette applied RFID labels to their razor blades and battery products at carton level during the production process. At the end of the production line, each carton was read and a containment record was built. The shipment was captured as it was moved from the Gillette Pack Centre to the Linfox DC to record exchange of ownership.
4. On receiving an order for a Gillette product from Metcash, Linfox built the pallet and the containment record by reading each carton via a conveyor system. To confirm the containment, the entire pallet load was read again during the shrink wrapping procedure. The unit load was then read as it was dispatched to the Metcash site and read upon receipt into the Metcash DC.
5. CHEP dispatched RFID tagged pallets to Gillette and empty pallets were returned from the Gillette site to CHEP. As pallets were dispatched from CHEP and returned to CHEP, they were read to record the movements. As pallets arrived at Gillette and were dispatched back to CHEP, they were read to record the movements.
6. CHEP dispatched RFID tagged pallets to Proctor & Gamble (P&G). The pallets were read as they left the CHEP site and the receipt of the pallets was also recorded as they arrived at P&G.
7. On receiving an order for a P&G product, Linfox built the pallet and the containment record by reading each carton as it packed onto the pallet. The unit load was then read as it was dispatched to the Metcash site and read upon receipt into the Metcash DC.
8. Individual P&G cartons were read as they were packed for store orders at the Metcash DC.



Above: Physical flow of goods in the supply chain pilot.

Overview:
Key Challenges and Learnings

Key challenges

As there were six operational sites, a high degree of organisation together with a clear vision of the project's scope and the outcomes were vital, according to projects managers, CSIRO and GS1 Australia.

Fiona Wilson, GS1 Australia General Manager, Standards Development, said the development of use cases was both essential and complex.

"Everyone's operations and requirements were different," she said.

"The consortium needed to map the processes, taking into account the information sources, needs and formats. We had to ensure each member of the consortium had adequate information, technology support and knowledge across the business, whether gained through training courses or experience from earlier pilots."

CSIRO's Dr John Mo said the consortium took a pragmatic approach to developing the use cases.

"The number of SKUs was limited to a manageable quantity," he said.

"The EPC processes were designed with the view that most transactions are straightforward and can be distinguished more explicitly. The processes were also supplemented with pre-warning notification between the partners. Three different types of EPC numbers were used: Serialised Global Trade Identification Number (SGTIN), Global Returnable Asset Identifier (GRAI) and Serial Shipping Container Code (SSCC). The most suitable tags for each application were selected to ensure the most effective read performance."

"This was the first demonstration in the world involving multiple partners along a single supply chain and this, in itself, was a challenge."

Whilst some of the partners brought experience from overseas and some had local knowledge, the information on hand did not answer all the questions at the start. In some cases, there was not a definitive solution, so the partners had to use their own expertise and a trial-and-error approach to solve problems.

"It was important to define a boundary for the project as a lot of people in the consortium had various understandings of what the pilot should achieve," Dr Mo said.

Simple technical decisions had far-reaching implications. For example, Ms Wilson said, it became important early on in the project to decide where ownership of the goods was exchanged because that was where RFID readers needed to be installed.

There were compromises made on the solutions to suit the equipment availability at the time. GS1 Australia's Fiona Wilson said, "One of the most important restrictions we had to face initially was the fact that there was no Generation 2 equipment available that was certified for use in Australia," Ms Wilson said. "This is no longer the case, but it meant that we did not have the benefits and better performance of Gen 2 technology."

"When the project first started, interoperability between readers, middleware and databases was limited because some of the relevant EPC standards were not yet ratified and, thus, there were issues with compatibility. This clearly demonstrated that the premise of a single set of global standards is critical because a lot of time was wasted trying to marry different interfaces. As more product becomes available that is EPC compliant, this process should become simpler and should provide for greater choices."

Above: Duracell batteries being read at production line.

Samantha Blake, Australian Food and Grocery Council's (AFGC) Assistant Director Supply Chain, said the unexpected hardware and software challenges were offset by collaboration between trading partners and information sharing.

Ms Blake said companies should form a cross-functional team incorporating a breadth and depth of skills right through to sales and marketing.

"Our recommendations for anyone involved in a similar project are to form cross-functional teams, carefully define the project scope, allocate all the resources needed and set clearly defined measurables. Adequate knowledge and resources are key to a project such as this."

Samantha Blake said it was important for anyone setting up a similar trial to understand the fundamental features of RFID and what it could mean for their business.

"Engage with as many disciplines as possible within the business and integrate the pilot within the business," she said.

"Be sure that you have appropriate internal capability to take on a project of this scope," she said. "Lastly, being prepared to make mistakes and develop learnings from them was vital."

Dr John Mo summed up the project's key learnings with: "Keep it simple. Make sure you understand every part of the chain of activities before you start. The real benefits from EPC Network implementation come from the cooperation and commitment of everybody in the supply chain."

Key learnings

- A single set of global standards reduces time and saves money. This fundamental principle was proven, as the consortium's hardware selection was limited due to a lack of standardised interfaces at the time of purchasing the equipment.
- The use of RFID technology delivered benefits by enabling the identification of multiple layers of items without changing normal business processes. For example, in an RFID enabled environment where assets, trade items and unit loads are tagged, the movement of a unit load through a dock door will capture not only the unit load identification, but also the trade item and asset information. Today you may be able to do this with bar code technology but the process would be much slower and very labour intensive.
- The EPC Network principle works and provides visibility for supply chain participants that is currently not available via any other means. Whilst you may be able to exchange data with direct trading partners, the ability to exchange information with any other organisation in a standard format is a powerful tool, which will provide many benefits to organisations.
- Real time information is available via the EPC Network, which allows businesses to make informed business decisions based on live information rather than historical information.
- You don't need 100 per cent reads to achieve 100 per cent data. Building a containment record at the time of construction ensured information related to all product movements was available.
- Within all organisations there are "pain points" which cost both time and money. The EPC Network with it's use of RFID technology and easily accessible, detailed information has been identified as a tool to solve some of these issues.
- Cross-functional teams make implementation easier and give participants greater benefits.
- Internal knowledge is critical to success, increasing understanding and learnings. It is important to have knowledge and support from IT, RFID and business people.
- Develop detailed use cases at each point. These should include physical process and the information required.
- Ensure the system is designed and installed by partners with RFID knowledge and experience. This will ensure maximum performance of RFID hardware.
- Collaboration increases the benefits of the EPC Network. This includes collaboration between consortium partners and within organisations.

Key Challenges and Learnings: Brand Owners

Gillette

Gillette set-up and challenges

At the Gillette site, many of the challenges were with the technology used and the processes developed. Two different readers, both from Alien Technology, were used for different applications.

- The Alien ALR-9780 was used to read items moving through dock doors
- The Alien ALR-9640 – Smartenna was used in the Pack Centre to read single cases as they came down the line.

Bruce Grant, EPC/RFID Project Manager at Gillette Australia explained that the Linfox Data Centre had a legacy radio frequency scanning system running at the same frequency as the RFID readers.

"Initially, we had to overcome the interference this caused to the RF scanners by only running some RFID read points outside DC operating hours," Mr Grant said.

"RF scanners and, in general many RF systems, are moving to a different frequency, so as these systems are replaced or upgraded this interference will not be an issue."

According to Mr Grant, the writing of accurate and detailed use cases was extremely important in such a project.

"When putting together an RFID cross-functional team, make sure there is someone with expertise in this area as it will pay off as the project progresses," he said.

"Also, think about what you are going to use the captured data for, how it will be accessed and how often, how will it be presented. Then, write your use case from the bottom up, start with the manual processes and then overlay the technology and data requirements/processes to give you a chronological view of the application."

Mr Grant listed several elements that should be considered when writing a use case:

- Physical processes carried out in the application and how are they executed
- Technology being utilised and how will it be integrated
- User interface if necessary, and, if so, what the screen will look like
- Processes the operator will follow, such as opening and closing a customer order

Gillette learnings

1. Engagement

For Gillette, the first lesson concerned engagement.

"While this pilot evolved around technology and process, it came down to the people. I'm particularly pleased with the way our team embraced the pilot and enthusiastically addressed any issues – without them we would have been nowhere," Bruce Grant said, adding that senior sponsorship was critical.

"Our pilot touched so many parts of the business," he said.

"You need senior management support to test and to learn. Include all parts of the business in your planning. For example, in choosing the SKUs for the pilot we had to talk to sales and marketing about potential customer promotional activity and possible deletions or additions to the range.

"Include operational staff because no matter how you try to quarantine the pilot you will affect the business. Be up front with all stakeholders, listen to any concerns and take action early."

Mr Grant said it was important to work with committed partners.

"The real value in EPC is in sharing data across multiple partners so only work with other end users who are committed to making any pilot work," he said.

"Choose your vendors carefully to give yourself the best chance of success. As well as technical and any specific application knowledge, make sure they have local capability, their products are Australian compliant and readily available, and that they understand the Australian regulatory environment."

2. Execution

Execution also held several lessons for Gillette.

"Be patient – this technology is new," Bruce Grant said.

"Be pragmatic about any systems integration. Anticipate the amount of work and cost involved in the pilot, balance this with your objectives. Consider scalability and have a clear project scope.

"Have clear documented use cases and a project plan but still expect plenty of surprises. Test extensively before deploying because the extra learning will avoid so many hidden pitfalls when you go live."

Lastly, Mr Grant emphasised the need to build on-site competency.

"We decided to become as self-reliant as possible," he said.

"We wanted to be able to deal with on-site issues as they arose and maximise our learning. We put together a cross-functional team with hardware, software and supply chain expertise and trained them in RFID by putting them through Alien's RFID Academy."

CAPILANO HONEY LIMITED

Capilano set-up and challenges

Invited to bring the project the perspective of a small-to-medium enterprise (SME), Capilano Honey did not have an operational site. However, the company's primary interest was in the power of RFID technology's use in the supply chain, according to Capilano's IT Manager, Mark Noake.

"No small to medium business would be able to set up a pilot such as this as they simply do not have the resources, either in terms of people or financially," Mr Noake said.
"They will have to wait until the bigger companies have trialled the technology and it is made available commercially."

His advice to SMEs wanting to use RFID was to wait for further development of the systems and to remain informed about any developments.

As a member of the consortium, Mr Noake said Capilano could see the enormous potential of the technology.

"While it is very early days in terms of the technology and there are issues that those with operational sites have had to sort out, we can see that as this technology develops it will change the way data is exchanged across the supply chain. This in turn will change the way we operate our businesses."

NUGAN ESTATE

Nugan Estate set-up and challenges

The project provided Nugan Estate with an invaluable opportunity to see how RFID could better track wine stock through the supply chain, according to National Sales Manager, Tiffany Nugan.

"Obviously, if it weren't for this pilot, we would not have been able to see first hand how this RFID technology worked, its benefits and challenges for users," she said.
"Whilst it is still early days for this technology, like all technology, with time it will be improved and made more accessible – at that point it will be useful to SMEs in the day to day running of their operations."

Key Challenges and Learnings: Brand Owners

Procter & Gamble set-up and challenges

The lessons learned at Procter & Gamble (P&G) during the pilot revolved around four key areas and the P&G team offered this advice:

1. RFID Architecture Design

While every site is physically different, and the requirements of an RFID deployment will be driven by the application and desired benefit, try to avoid bespoke hardware and minimise customisation to software. By keeping hardware and software as "out of the box" as possible for trials (and potentially roll outs) organisations will reduce their exposure to third party expertise and can build internal competence to deal with any on-site issues more easily. Using standard hardware and software will also reduce some of the complexity around integration with legacy systems.

2. Process Design and Enhancement

In a test situation, when introducing RFID to improve existing processes and measuring the improvement RFID can bring, consider any process change that needs to be made to prove the test, and most importantly how the improved performance will be measured. This can also be applied to the longer term - when designing an RFID system keep the end goal in sight. Ask yourself where the benefit is going to come from, how it will be achieved and how it will be measured.

3. Project Structure

All of the participants benefited from conducting this test in a consortium structure with partners from different pieces of the supply chain. There was a healthy level of exchange and experience sharing between the consortiums members which helped to resolve the issues each site experienced. Resolution times were significantly reduced at P&G by being able to draw on a variety of resources if required. RFID touches many parts of the business and a cross functional team with RFID training is very beneficial.

4. Data Management\ Analysis

There is no question that RFID technology can generate large amounts of data. As a result it is important to understand from the outset of any project how the resulting data will be utilised. A feedback mechanism or analytics tool should be considered in the design phase to filter and present the data for meaningful analysis. Properly defined metrics and control parameters for key processes enable fast identification and correction of issues without incurring significant incremental cost.

Left: RFID tagged products being read at shrink wrapping station.

Key Challenges and Learnings: Packaging Suppliers

Visy set-up and challenges

Visy Industries installed two antennas and one reader at a dock door at its Melbourne warehouse, allowing Visy to read both incoming pallets from CHEP and outgoing pallets to Gillette.

Andrew Stuart, Manufacturing Solutions Manager, Visy Industries said this simple level of tracking was Visy's objective, as their focus for the pilot was all around data visibility of interactions with external parties, both customers and suppliers.

"We have been running RFID pilots as part of our internal processes for a few years now, but we have never dealt with the technology in exchanges with other parties", he said. "To keep the National Demonstrator Project simple, we decided against linking any of our core transactional systems to the pilot, and with all reads being captured at a higher level by Verisign, we believed that sufficient data would be available for analysis"

Visy used its own RFID data capture software to gather tag reads and added a small amount of code and a manual step to send the data to VeriSign's Internet systems.

Mr Stuart said the issues that Visy faced concerned the physical placement of the antennas and tags to ensure that reads were successful, this being largely solved by trial and error. "Our initial tests saw us walking through the dock door carrying a mock-up of a pallet with both a CHEP tag and a Visy EPC tag.

"We had a high read rate at distances of up to 2 metres, however when the actual pallets arrived from CHEP we had a lot more trouble getting reads. This was solved with changes in the orientation of the readers and their positioning.

"We saw the pilot as a success as we achieved our data visibility objectives", said Mr Stuart. We wanted to use the latest technology to track the movement of pallets of cartons from our store to our customer's, and then look even further down the supply chain to see the movement of the cartons leaving our customer's store."

"More visibility down the supply chain gives us more timely information about demand and gives the opportunity to better serve our customers. "This pilot provided us a small window into what the future might look like in an RFID enabled supply chain."

Mr Stuart said that the issues Visy faced concerned the physical placement of readers, antennas and tags to ensure readings were successful, which was determined largely by trial and error.

Visy learnings

Mr Stuart offered two tips for those planning a similar pilot:

1. Above all, gain assistance

"If you are looking at doing a trial, get help from other organisations that have proven ability in the field", he said. "There are now people around who have experience with RFID technology, so get them on board to help you, otherwise you will spend a lot of time in trial and error."

2. Business Benefit

Mr Stuart said it was most important to keep a business benefit in mind when setting up any trial. "While it is interesting to use new technology and find out exactly how it works, you are wasting your time unless you can determine how it will benefit your business at the end of the day."

Key Challenges and Learnings: Retailers

Metcash set-up and challenges

One of the major challenges for Metcash was having the technical know-how and expertise in place when problems arose during the project, according to Metcash's National Business Development Manager, Dominic Wong.

"Essentially we were in unchartered waters and we had issues with hardware, for example with calibration, as well as with software that had not been encountered before," he said.

Mr Wong said Metcash had encountered frequency issues with the RFID project and existing systems within Metcash. Metcash is one of Australia's largest marketing and distribution companies and Mr Wong stressed that the warehouse in which they were trialling the RFID system was fully operational and extremely busy.

"We used a warehouse that had a 950MHz backbone instead of one of our newer warehouses, which has a 2.4GHz backbone.

"We knew that RFID would be in the area of 900MHz and we anticipated that there might be issues between the RFID system and legacy systems in place.

"We enlisted the help of the CSIRO who did testing to establish if there would be problems and initially it was thought there would be no problems. But, in fact, we found that our forklift signals were interfered with by the RFID system and this raised issues for Metcash."

As current and future forklift systems are being produced at 2.45 GHz, the compatibility issue was seen as a temporary, but significant, issue that would be eliminated as legacy forklift systems are replaced.

Below: Products being dispatched from Linfox.

Metcash learnings

1. Develop in-house capability

"This frequency conflict was a major learning for us – the sort that only comes from trialling and working on the technology," MrWong said. "It is important to have people available with the expertise when these sorts of problems occur. Businesses wanting to undertake a project of this size must commit enough resources, both in terms of people and finance, to ensure they have the right people with the right knowledge."

2. Ensure you have buy-in

Mr Wong stressed that it was very important that any trial should have the buy-in of all stakeholders.

"Within a business it is vital that everyone is included, for example, operations and human resources, so they have a stake in the project", he said. "Also, all external parties need to be on board. This RFID project was a very ambitious project with a large number of parties involved and it was a major achievement to get buy-in."

3. Be prescriptive

The project manager must be prescriptive and tie down parties' responsibilities, Mr Wong said. "To work collaboratively and successfully you need thorough scoping and defining of responsibilities," he said.

4. Don't follow blindly

"None of the lessons we learned would have happened from reading the literature," Mr Wong said. "Every environment and business is different and so you cannot learn just by reading. There are some common situations and definitely some situations that are specific so be mindful that someone else's learning is different and don't follow blindly."

5. Get started

If you believe your business has a business problem to do with the supply chain that this technology could solve, go ahead and start getting your senior managers involved, Mr Wong said. "Also, find other people who have experience to collaborate with you on the project."

Above: Tagged CHEP pallets and reader at Linfox site.

Key Challenges and Learnings: Third Party Logistics (3PL)

Linfox set-up and challenges

The complexity of use cases should not be underestimated and they should be carefully selected, according to Michael Fraser, Logistics Planning Manager, Fast Moving Consumer Goods, Linfox Australia.

"Use cases are the description of how the business processes work with the system," he said.

"It is well known that any process involving human interaction is subject to unexpected changes and errors. The use cases must be designed to minimise the impact of operational variations. There were 11 Gillette use cases applied to six locations in the Gillette/Linfox site and some of the use cases were later found redundant due to an adjustment of the business processes."

Linfox explored a number of issues with the RFID technology, including interference with current Radio Frequency (RF) systems. Spectrum analysis was undertaken to determine interference risk.

The tests conducted demonstrated conclusively that there was a significant risk to the in-house RF system due to RFID deployment. The virtually complete overlap of the two systems (RFID and in-house RF) meant there was no convenient gap in the spectrum for the RFID transmissions. Instead, Linfox created an out-of-hours operational window to pass product through the RFID system for the trial.

Linfox also faced occupational health and safety issues on the use of RFID and implemented NATA certified testing of hardware to ensure levels of electromagnetic radiation were compliant within appropriate regulations.

"We consulted widely with staff and employee representatives at site and national levels well in advance of implementation, providing insight into the reasons we were testing, " Mr Fraser said.

Linfox learnings

Linfox offered eight clearly defined steps for others wanting to set up a similar pilot:

1. Define potential use cases

Begin with the end in mind by carefully selecting your use case and deciding where to invest your energy as there are many potential use cases, such as a reduction in out-of-stocks for fast-moving items, leading to improved sales or reducing reliance on manual checking or auditing processes.

2. Undertake a situation appraisal

It will be important to break down the way you are currently doing things and use problem analysis methods to discover how you intend to deploy RFID to improve the situation.

Below: CHEP RFID tagged pallet.

Below: Linfox RFID dock door.

3. Understand the potential size of the prize

Once the weaknesses in current business processes are identified, it will be necessary to estimate the potential benefit that will come from deploying RFID and improving the business processes using the data that the system provides. This will assist in building the expected Return On Investment (ROI).

4. Carefully define the scope of the field trial

Business problems usually have many contributing factors and the trial could become unwieldy if it attempts to correct all the connected processes. Ensure the scope of the trial can be managed. Start small and establish reasonable expectancies, then progressively expand the scope only once the benefits and learning for the current scope are delivered.

5. Determine which products to tag and where to place interrogators

Based on current work processes related to a particular use case and where the problems are that need to be fixed, it should be possible to determine which products to tag. It is also important to think carefully about where and how to read tags and not make assumptions. The planning and development element of the project work can take a long time but it is time well invested rather than extending the time of the field trial.

6. Determine how to measure the results of the field trial

Take the time to baseline current process results so your efforts and results are suitably understood.

7. Determine the ROI

When you have confirmed that the results are attributable to the use of RFID, it then remains to determine the ROI by multiplying the savings across product lines and/or facilities and subtracting the cost.

8. Connect use cases

EPC/RFID technology is a solution that can solve more than one problem once you have understood small-scale deployment. After the benefits from one use case are confirmed, examine how the same solution could be applied to other use cases to achieve a healthier ROI.

Key Challenges and Learnings: Returnable Asset Suppliers

CHEP set-up and challenges

Global experience in RFID projects helped CHEP overcome many set-up issues, according to CHEP Asia Pacific Manager Information Systems, Murray Fane. "Having RFID experience is a must if you wish not to re-invent the wheel all the time," he said.

"CHEP's Innovation Centre regularly tests RFID tags to find the one that performs best for pallet use.

"Although we received a stock of the preferred tag for our pallets, the Alien readers used by other National Demonstrator Project members could not read them - an open standards problem that will be fixed by Generation 2 standards. With some modification we were able to use the same Alien tags used by the other trial parties, which although not tuned for pallet use, operated effectively if placed on the outside of pallets. Although only a limited trial, the tags remained in position with no damage.

"CHEP decided to use Psion Teklogix 7535 hand-held readers. We developed our own software to read tags and then send data to Verisign in accordance with their web services specification. The Teklogix readers were Wi-Fi enabled and we realised we could develop a web site that could be accessed over the LAN through the Wi-Fi enabled reader. This meant we did not have to learn how to develop software for a hand held device but could utilise our existing web development skills.

"Getting a working system was surprisingly simple and effective. The read rates were 100 per cent with the hand-held readers, and since they were portable, we did not have any issues with setting up."

Mr Fane said that the development of use cases was quite simple since "all that had to be done was to read pallets at the point of Issue and send data to Verisign". He stressed that location naming was important to impose a type of movement logic on reads when using a single hand held reader.

"Once we were underway, we started to see information flow into the Verisign web portal from each supply chain partner," he said. "Immediately we could see the possibilities of RFID, not just in track and trace but also in the potential to use this new level of data precision to lean out the whole change of ownership process."

Below: RFID hand held reader at CHEP pilot site.

CHEP learnings

CHEP's Murray Fane offered five tips based on project learnings:

New processes and information

"The project team was working with new processes, new technology, and new systems. All of these represent possible failure points, especially as they are being introduced across a wide range of separate companies. There is also a lot of data. With only a few pallets physically delivered, we found we were initially inundated with information consisting of real reads, ghost reads and misreads. When starting a RFID project, you have to be prepared to spend time working with your supply chain partners to eradicate the source of all spurious reads before you go into full production."

Item level tracking

"A corporation's business systems are built to manage movements at an order level or load level. With RFID, everything comes in at unique item level. The EPC code we used was a GRAI code (Global Returnable Asset Identifier), which identified each individual pallet, but most systems do not have the ability to map that to an order. It was clear early on that we needed a way to match read events with planned events - we needed to know not only where a pallet was read but also where it should have been read. So, even though you may not initially tie RFID events to back end systems, it is worth sourcing or developing software to assist with end to end item level tracking. Such software is starting to become available."

Individual pallet stories

"It only took one week for us to see and grasp the complexities of tracking with RFID across a supply chain, not from the physical tag and reader perspective, but from the data perspective, which was our main area of interest. A pallet became an individual and, with data sharing, that individual had a story. For the first time ever, we were able to track an individual pallet; it was no longer lost in the crowd. We believe this will have significant implications for asset control and potentially in the recall process in food industries."

Spotting process problems

"Although pilot volumes did not allow it, we could see that by tracking a unique item we would be able to identify norms that set our efficiency expectations and identify where process breakdowns occur. By tracking the whole supply chain, we could potentially see how these process problems have a knock on effect later. By progressively eliminating these bottlenecks, we could improve the efficiency for all stakeholders. All this is made possible by the constancy of the GRAI combined with data sharing. The benefits we see for our customers could include leaning out the change of ownership process, with potential savings in wasted staff effort."

Real time track and trace with alerts

"We realised that, through centrally available shared data, we could get real time information of a pallet's location, which door it passes through, exactly when it arrives at its destination and what it is carrying. This opens up the possibility of real time track and trace with our pallets and the goods travelling on them.

"Once norms are established, we can set up alerts when deliveries do not arrive as expected, or we can use estimated delivery dates and times as the trigger. Alerts will be real-time, which allows managers to deal with issues as they arise as opposed to days or weeks later. During the trial, we tested the hypothesis by manually polling the VeriSign web site to look for pallet arrival. We saw pallets arrive at Gillette during the three hour norm and also identified a missing read of one pallet at the precise time it was supposed to arrive. This sort of information, when shared collaboratively with supply chain partners, will provide insights into ways to build continual process efficiency gains."

Real benefits with collaborative RFID

"The final stage of the project involved an analysis of potential benefits for the entire supply chain using our Pilot experience. For CHEP, we can see how RFID can help with some four walls projects but our analysis showed that collaborative RFID has the potential to reduce significant administration overhead in the control and management of pallets for CHEP and all of our RFID enabled customers. It represents a win-win situation for everyone."

Below: Sample of EPC event data for a single item.

Location	Time (UTC)	EPC-IS	Implied/Actual
Metcash Dock Door 1	27 Feb 2006 09:31 EST	Metcash	Real
Metcash Dock Door 1	27 Feb 2006 09:31 EST	Metcash	Real
Metcash Dock Door 1	16 Jan 2006 09:46 EST	Metcash	Real
Gillette Shipment Dock Door	13 Jan 2006 15:26 EST	Gillette	Real
Gillette Wrapping Station 1	13 Jan 2006 14:56 EST	Gillette	Real
Gillette Pick Face 1	13 Jan 2006 10:27 EST	Gillette	Real
Gillette Pallet Receipt Dock Door	04 Jan 2006 15:26 EST	Gillette	Real
CHEP Clayton Outbound	04 Jan 2006 12:20 EST	CHEP	Real
CHEP Clayton Inbound	04 Jan 2006 10:36 EST	CHEP	Real

Conclusion

The National Demonstrator Project was an opportunity to demonstrate each element of the EPCglobal network within Australian industry.

A single set of global standards is key to reducing costs and providing additional benefits through greater efficiencies, visibility, information timeliness and accuracy and availability and choice of hardware and software. This project proved that the EPC Network could be implemented and highlighted potential business uses for each type of participant.

Participating in the pilot gave consortium companies real life experience with RFID, meaning they are well prepared should RFID mandates become a reality.

The project proved that disparate parts of supply chains could be linked and that the EPC Network could be used to show change of ownership and status of items moving through complete supply chains when trading partners made information available.

Initially, there were concerns over sharing data but the project showed that sharing appropriate data worked well and there was a business benefit for all through increased collaboration. Consortium members found that collaborative learning took place not just within each business but also across the entire group. It was found that cross-functional team knowledge and internal knowledge increased both the ease of piloting, internal learnings and business benefits.

Previously, it had not been possible to identify individual items moving through the supply chain but, as real-time information became available to consortium members through the project, supply chain visibility was enhanced adding a new dimension to supply chain management. The project found the supply chain changed from an unknown sequence into a visible, timed sequence.

Asset tracking was proven as one of the business benefits and potential applications. The project showed that while an asset may have only one owner, it moved through many companies' sites where relevant information could be added to supply chain data if required. The project demonstrated that it is possible to share data with trading partners at any point in a supply chain and with multiple partners, not just on a one-to-one basis.

Although the hardware selection available to the consortium was limited, the project found that it was not necessary to have 100 per cent reads to have 100 per cent data. However, building containment was critical in ensuring 100 per cent data.

The SME participants in the consortium indicated that, if implementing an RFID system, they would require a more 'off-the-shelf' solution and would prefer to work with groups of interested customers.

While the scope of the project was confined to the grocery sector, it demonstrated that the benefits of the EPC Network solution could be replicated easily to other industry sectors. Systems can be linked together to share benefits and costs across an entire supply chain.

The streamlining of the supply chain process can deliver increased efficiencies, including improved batch control and recall processes. The project also demonstrated that it is important to mine the available data, looking for exceptions, especially across partners. With access to more detailed data, better business decisions can be made.

While Generation 1 technology was initially the only choice open to the project, in future, Generation 2 technology will deliver even greater benefits.

Recommended Actions

The experience and learnings from the National Demonstrator Project will help companies wanting to undergo a similar pilot or implementation by identifying the areas they need to investigate within their own business.

Above: RFID reader located at Procter & Gamble dock door.

We encourage Australian organisations to use the information contained within this report to further explore the uses and benefits of RFID technology and the EPC Network not only within their organisation - but within their supply chain.

Collaborative RFID

Having proved that the collaborative sharing of RFID events and information is possible with today's technology, the consortium turned to the question of business benefits and the next recommended steps. Some of the companies involved in the pilot had successfully implemented RFID within their own environment but the final question put forward was how the business case for RFID changed if all partners in the supply chain adopted RFID with collaborative data sharing or "collaborative RFID".

It would be challenging to develop one formal business case for a complete supply chain across multiple trading partners, however the consortium developed a pragmatic estimation methodology by combining expert knowledge of their business environments with that gained from the pilot. The methodology is not designed to address ROI, as each user would utilise financial modelling specific to their application and financial needs. It does, however provide a qualitative and quantitative tool to estimate benefits across the supply chain and could be adopted as a starting point by any group of companies considering collaborative RFID.

Please turn over for more information

Recommended Actions

Step 1: Consider RFID benefits

The first step is to consider various categories of benefits provided through RFID implementation. The consortium used the following list as a guide and added specific benefits for their environment. Refer to diagram 1.

Benefit category	Notes
Out of stocks	Including promotions failures
Inventory management	Reduction, returns, obsolescence, perishable, auto replenishment, less safety stock
Visibility	Demand and supply status
Track and trace	Real time problem solving, reduced queries, reduced losses, reduced customer service effort, fewer invoice discrepancies, reduced misdirected equipment
Losses	Where, how and when
Process improvements	Identify supply chain norms and spot deficiencies. Real data for Six Sigma/Lean improvements
Stock take	Including easy product identification
Optimisation	Asset utilisation, transport, supply chain, asset cycle time
Recall administration	Related to tracking and easy identification
Data entry	At item, carton, pallet and consignment levels for change of ownership and internal movements
Proof of delivery automation	Saving the need for alternative systems. Individual item for accuracy not just a load
Reduced labelling	Particularly as goods move through the supply chain
Damage	Who, what, where and when

Diagram 1: Potential EPC/RFID benefits.

Step 2: Estimate financial savings for you and your partners

For each benefit category, each consortium partner from the sub-team workshopped the estimated benefit that could reasonably be achieved. Estimates were rounded to 'tens of thousands' or 'hundreds of thousands,' with an associated degree of confidence. The approach provided good insight into each application and benefit in a very short time, which could later be utilised as a stepping point to rigorous financial and operational assessment.

Each partner also assessed the benefit that would flow on to other trading partners as a result of their new processes and facilities.

Step 3: Estimate costs and determine your 'Go RFID' statement

The analysis included an assessment of costs, whether it was a four-walls activity or complete supply chain activity and what else was needed to realise the benefit (e.g., systems, number of partners collaborating). During the process, each partner developed a statement that summarised the potential benefits, what they are willing to invest and finally what they would need for the company to fully adopt RFID – termed the 'Go RFID' statement. This was all summarised in a supply chain benefit model. Refer to diagram 2.

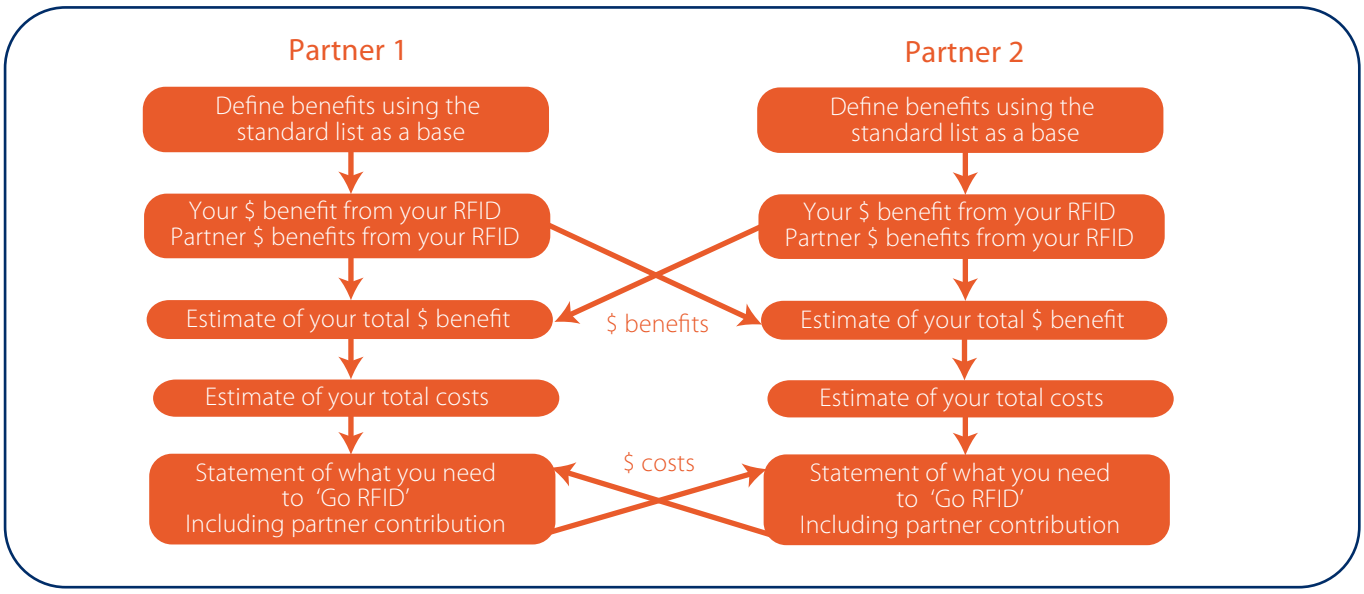


Diagram 2: RFID supply chain benefit model.

As a first cut analysis the methodology provided an insight into what collaborative RFID would look like subject to positive results of an organisation's own financial and operational assessment. It was clearly seen that:

- Four-walls RFID and small chain loops will benefit from RFID but benefits significantly increase if end-to-end RFID is enabled. The multiplication factor can be five to ten times larger, making the business case to 'Go RFID' much more attractive.
- Almost all participants (including SMEs) throughout the entire supply chain are likely to benefit when collaborative RFID is widely adopted. Individual savings for key corporations will conservatively be in hundreds of thousands of dollars. Benefits for the entire supply chain will be in many millions, providing a significant competitive edge for Australian companies.
- Implementation costs should be relatively low in relation to the potential benefit. The large carton quantities, however, mean carton tag costs cannot be more than AU10 cents. There will need to be a seeding period, where reusable asset suppliers and their supply chain partners share the cost of placing the more expensive tags on reusable assets. Once the fleet has been tagged, costs would drop significantly to maintenance levels, thus providing all the benefits of RFID at a low cost for the complete supply chain.
- The benefits cited above can only be attained if Australian standards allow a 4 Watt EIRP reader since 1 Watt EIRP will not deliver the reach required to read tags consistently throughout the supply chain.
- Although some benefits can be achieved through bar codes, RFID is the only technology that will give the collaborative step change in benefits. For example, pallet management is one of the major advantages cited in the analysis, and this can only work with RFID due to theneed to read pallets as they pass through dock doors on forklift trucks.
- Aside from the operational savings, potential benefits include business opportunities offered by capabilities such as track and trace.

The next step is to identify your organisation's supply chain benefit model, and then expand that vision to include groups of partners and, ultimately, build supply chain benefit models.

When the models reveal compelling benefits from collaboration, formal financial models need to be completed, agreements on financial collaboration agreed and production projects implemented. There is a substantial amount of work to make collaborative RFID a reality in Australian supply chains, but the potential for, and of, the technology is clear.

Appendix:
About the Participants

Australian Food and Grocery Council

The Australian Food and Grocery Council (AFGC) is the national body representing the nation's food and grocery products manufacturers. The food and grocery products industry is Australia's largest manufacturing sector, employing more than 200,000 Australians and contributing 2.5 per cent to gross domestic product.

The role of the Council is to help shape a business environment that encourages the food and grocery products industry to grow and remain profitable. It provides food and grocery products manufacturers with a platform from which they can voice their views on a range of issues.

Specifically, the Council provides input into policy formulation that impacts on profitability, viability and sustainability of the industry, develops strategies that address key issues confronting the industry, represents and promotes the industry at all levels, both nationally and internationally, and works with governments and related industries and other stakeholders to achieve mutually beneficial outcomes.

www.afgc.org.au

Capilano Honey

Capilano Honey was founded in 1953 by apiarist Tim Smith and his brother Bert, who began the business by packing and selling their Capilano brand honey to grocery stores around Brisbane. Over the next 20 years, Capilano expanded into interstate and overseas markets and became an unlisted public company in 1974.

Today the company turns over A$80 million annually and is one of the top three honey companies in the world. It is now a public company, listed on the Bendigo Stock Exchange and has operations in Australia, Canada and South America. The Capilano brand is exported to 38 countries across Europe, the Middle East, Asia Oceania and North America and can be found in major retail chains. A subsidiary company, Medihoney Pty Ltd, is a world leader in the research and manufacture of honey-based products for healthcare, challenging the reliance on synthetic medicines and treatments.

www.capilano.com.au

CHEP

CHEP is the global leader in pallet and container pooling services, serving customers in a wide range of industrial and retail supply chains, including consumer goods, fruit and vegetable, meat, home improvement, beverage, raw materials, petrochemical and automotive industries.

CHEP partners with raw materials and ingredients suppliers, manufacturers, growers, transporters, distributors and retailers to move their products through their supply chain, improving efficiencies, reducing costs and meeting their customers' needs.

CHEP's services are based on a unique combination of customer-driven solutions, high quality products, sophisticated control systems, a well-managed global service centre network and advanced logistics capabilities, which enable customers to reduce the need for capital expenditure and concentrate on their core business competencies. CHEP manages the daily movements of over 265 million pallets and containers from a global network of over 440 service centres in 42 countries with more than 300,000 customers worldwide.

www.chep.com

CSIRO

CSIRO is Australia's national science agency and one of the largest and most diverse scientific research organisations in the world. Their role is to deliver great science and innovative solutions for industry, society and the environment.

CSIRO works on new ways to improve quality of life, as well as the economic and social performance of a number of industry sectors through research and development.

Established in 1926, CSIRO is the single largest employer of scientists in Australia, with more than 6,500 people conducting and assisting with scientific research at 57 sites in Australia and around the world.

CSIRO's primary roles are to:

- Carry out scientific research
- Assist Australian industry and to further the interests of the Australian community
- Contribute to national and international objectives and responsibilities of the Commonwealth Government
- Encourage or facilitate the application and use of the results of its own or any other scientific research.

www.csiro.au

Gillette

Headquartered in Boston in the United States, the Gillette Company is the world leader in male grooming, a category that includes blades, razors and shaving preparations. Gillette also holds the number one position worldwide in selected female grooming products, such as wet shaving products and hair epilating devices. In addition the company is the world leader in alkaline batteries and in manual and power toothbrushes. Since this project commenced the Gillette Company has been acquired by Procter & Gamble.

www.gillette.com & www.pg.com

GS1 Australia

GS1 Australia (formerly EAN Australia) is the local administrator of the internationally recognised GS1 System of standards for EPCglobal Network, bar coding, numbering and eMessaging.

GS1 numbers offer a standardised means to identify products, services, shipments, assets and locations, which are used to monitor and control the flow of goods from raw materials supplier to customer, enabling automated collection and validation of data whilst enhancing supply chain management efficiency.

Serving Australian industry for more than 25 years, GS1 Australia is acknowledged as being a leader in eCommerce and Supply Chain Management initiatives including EPC/RFID standards development.

With over 16,000 members nationally, GS1 Australia encourages the adoption of best practice supply chain processes in every corner of the Australian economy.

GS1 Australia delivers the information, advice and the services needed to make the GS1 system work for your business including access to: bar code verification; accreditation program; digital imaging and dimension measuring of products; data synchronisation catalogue, commonly known as EANnet®; training and education seminars; supply chain implementation project management; industry engagement programe.

www.gs1au.org

Linfox

Linfox was established in 1956 by Lindsay Fox with just one truck and is credited for pioneering integrated logistics in Australia. Today, Linfox remains the industry leader in the provision of warehousing, transportation and supply chain management and inventory management services and employs over 11,000 staff and maintains a transport fleet in excess of 6,000 vehicles.

Linfox, through its various subsidiarie,s owns large-scale commercial properties, an international airport, a domestic airport, Australia's largest vehicle proving and testing ground which also incorporates a driver training school. It also owns nationwide and international freight forwarding services.

Linfox Logistics is structured into industry streams covering the retail, beverage, industrial, petrochemical and building products sectors. Specialist supply chain management and inventory management services support these divisions. Linfox specialises in providing total supply chain solutions supported by a team of highly trained logistic specialists throughout Australia, New Zealand and South-east Asia, permitting focus on industry and country specific issues.

www.linfox.com

Metcash

Metcash Trading Limited Australasia (Metcash) is a leading marketing and distribution company operating in the food and other fast moving consumer goods categories. It has three Business Pillars - IGA Distribution, Campbells Cash & Carry and Australian Liquor Marketers.

Metcash has a clear motto - to be "The Champion of the Independent Retailer". It is currently one of the best-performing stocks on the Australian market, a status that vindicates strategies put in place by management.

High service levels remain at the core of Metcash's success. If our customers are not successful, we are not successful. The company continues to focus on teamwork and staff training programs for the benefit of employees, customers and stakeholders.

www.metcash.com

Nugan Estate

Nugan Estate is a premium producer of fine wine and extra virgin olive oil based in Griffith, NSW. It is part of the Nugan Group, which was founded in 1940 as a fruit and vegetable packer and expanded in the 1970s into juice production. The group later became one of the largest exporters of niche juice products to Asia.

Nugan Estate currently has 875 hectares of vineyards in the Riverina, Coonawarra, McLaren Vale and King Valley.

Operated by Michelle, Matthew and Tiffany Nugan, the Nugan Group is now complemented by the two wine labels, Nugan Estate and Cookoothama, premium Nugan Estate olive oil and the award winning Griffith restaurant Michelin.

www.nuganestate.com.au

Procter & Gamble

Three billion times a day, Procter & Gamble brands touch the lives of people around the world. The company has one of the strongest portfolios of trusted, quality, leadership brands, including Gillette®, Duracell®, Pampers®, Tide®, Ariel®, Always®, Whisper®, Pantene® , Mach3®, Bounty®, Dawn®, Pringles®, Folgers®, Charmin®, Downy®, Lenor®, Iams®, Crest®, Oral-B®, Actonel®, Olay®, Head & Shoulders®, Wella, and Braun. The P&G community consists of almost 140,000 employees working in over 80 countries worldwide.

www.pg.com

Sun Microsystems

Sun Microsystems deliver open standards-based systems and software to power leading enterprises in government, telecommunications, financial services, manufacturing, education and research, retail, health care, digital media and entertainment.

With a 20 year history of developing innovative technologies, Sun cuts cost and complexity while delivering quality results for customers. Sun works closely with its partner community to provide solutions from storage to identity management, servers to Solaris and can be found in more than 100 countries worldwide.

Sun's leading-edge technologies underpin the Internet and business networks and encourage people to join the Participation Age. This new era supports sharing and collaboration where participants improve opportunities for all.

www.sun.com.au

VeriSign

VeriSign operates intelligent infrastructure services that enable and protect billions of interactions across the world's voice and data networks. Every day, VeriSign processes more than 14 billion Internet interactions and 3 billion telephony interactions.

It also provides the services that help over 3,000 enterprises and 450,000 web sites to operate securely, reliably, and efficiently, and more than 130 leading consumer goods companies with expert analysis to make their point of sale data more actionable. VeriSign supply chain technologies are helping companies take product data to the next level of visibility and process improvement allowing better decision making and resource allocation.

With secure and reliable data storage, hosting, directory and intelligence services, VeriSign provides secure, timely access to relevant, actionable information across global trading partner networks. With experience in managing critical network-based services that enable online commerce and communication, VeriSign helps clients understand benefits and architectures for exchange of RFID-generated product movement information.

www.verisign.com.au

Visy Industries

Visy Industries is one of the world's largest privately owned packaging and recycling companies, employing more than 8,000 people in Australia, New Zealand and the US. It has manufacturing revenues of more than $2.8 billion with manufacturing assets exceeding $3 billion.

During its first 30 years, Visy concentrated on the manufacture of corrugated cardboard boxes. In 1979, the company built its first paper recycling mill and now operates eight paper recycling machines - six in Australia and two in the US, producing more than 1.2 million tonnes of 100 per cent recycled packaging paper annually.

Visy has constructed a $400 million plantation pine based pulp and paper mill at Tumut, NSW which produces 280,000 tonnes of packaging paper.

In 2001, Visy acquired Southcorp Packaging, now named VisyPak, adding products such as PET bottles and jars, aluminium and tinplate cans, paperboard cartons and rigid plastic packaging to its core corrugated packaging business. Visy now operates more than 100 packaging factories and recycling sites across Australia, New Zealand and in the US.

www.visy.com.au

Glossary of Terms

EPC Network	A set of technologies that enables immediate, automatic identification and sharing of information on items in the supply chain. Components include standardised RFID tags and readers, Electronic Product Code (EPC) numbers, EPCIS databases, ONS and Middleware.
RFID tag	A microchip attached to an antenna that contains data which can be sent to an RFID reader. They may be passive, meaning they have no internal power and only send data to a reader when they are interrogated, or active, meaning they have an internal battery source and can send signals further and usually store more data. Within the EPC Network RFID tags contain a unique serialised EPC number and supporting data in a standardised format.
RFID reader	An RFID reader communicates via radio waves with RFID tags and delivers the information in a digital format to a computer system. May also be referred to as an interrogator or a reader. Within the EPC Network there are standardised protocols on how the tags and readers communicate with each other.
Electronic Product Code (EPC)	Electronic Product Code is the unique object identifier (licence plate) on the tag which is used as a pointer to information about the item within the EPC Network.
EPCIS	The database component of the EPC Network which allows EPC related data and events to be stored, accessed and exchanged with trading partners. There is not a single EPCIS database, rather each organisation within the EPC Network has their own on which they store information relevant to the EPC products within their supply chain.
ONS	The ONS is an automated networking service that provides the ability to match EPC codes to information about the item which may be stored anywhere within the networked EPCIS databases.
EPC Middleware	The EPC middleware is basically a layer of software which takes the read information from the RFID readers, filters it and logs relevant event data. It manages real time read events and information, provides alerts and manages the basic read information for communication to the EPCIS.
Generation 2	The latest EPCglobal standard for UHF RFID tag and reader air interface protocol. Recently ratified also as an ISO standard.
Third party logistics provider (3PL)	Party providing logistics related services, such as transportation management, supply chain management, warehousing, re-packing products, distribution, and/or assembly.
Antenna	The conductive element that enables an RFID tag or tags to send and receive data.
Use case	A detailed description of a single activity in a business process that identifies data inputs and outputs, performance/timing requirements, the handling of error conditions and interfaces with external applications.
Air interface	The radio frequency link between a reader and RFID tags.
Discovery Service	A component of the EPCglobal Network consisting of a suite of services that enables users to find data related to a specific EPC and to request access to that data. Object Naming Service (ONS) is one component of Discovery Services.
Bar code	A precise arrangement of parallel lines (bars) and spaces that vary in width to represent data in a machine readable form.

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