MANAGE RFID ACCESS TO ITEMS ON THE INTERNET

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Annotation.
This article describes the global distribution of radio frequency signals and the specifics of RFID technology, the history of its emergence. It also shows how to transmit a radio signal through a radio frequency electromagnetic field and how to automatically detect an object, as well as how to design and implement automated control systems. The ability to read remotely RFID tags is a concern for people's safety. For example, an RFID key that a thief can count without being noticed will learn more about his access. The use of RFID tags has caused serious controversy, criticism and even a boycott of goods. You will learn about the privacy issues of this technology. In addition, some cities use RFID cards to pay for travel on public transport. In these systems, data is not only read from the card, but also written to the card. Here's a few basic facts about a stomp pad and how it is used.

Keywords: Radio frequency tags, RFID technology, Radio signal, control systems, RFID tags, boycott of goods, RFID public transport, RFID, technology privacy.
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Introduction

Radio frequency signals are the physical carrier of product electronic codes (EPCs) attached to observable elements that can be distributed and recognized, read and written globally. RFID (Radio Frequency Identification) technology has attracted attention in recent years as a key technology for building "Internet of Things". RFID technology originated in the UK and was used in World War II to identify an enemy. RFID (Radio Frequency Detection) is a method of transmitting and storing data from a convenient tag carrier to a desired location using special devices. Such identifier tags make it easier to identify different objects: goods in the store, vehicles during transportation, help to identify their location, can identify people and animals, not to mention the wide range of possibilities of identifying documents and property. The electromagnetic wave received by the RFID tag from the antenna activates it and it will be possible to write data to the tag and read the data from the tag. Thus, the antenna serves as a multifunctional communication channel between the transmitter and the tag, which provides complete data transmission and reception processes.It began to be used commercially in the 1960s. RFID technology is an automatic identification technology. The U.S. Department of Defense states that every military device must use RFID tags after January 1, 2005; The U.S. Food and Drug Administration (FDA) recommends drug manufacturers use RFID to track Fake drugs. A number of measures in the metro retail sector, such as Walmart and RFID, have contributed to the global application of RFID. In 2000, the price of an RFID tag was $ 1. Many researchers believe that RFID tags are very expensive and can only be used on a large scale by reducing costs. In 2005, the price of each RFID tag was 12 cents, while the price of UHF RFID was 10 cents [1]. For large-scale applications of RFID, on the one hand, the cost of RFID tags should be reduced. On the other hand, the use of RFID is related to the fact that it does not result in costly services. Statistics from the EU Statistics Office show that in 2010, 3% of EU companies used RFID technology, and their applications include credentials and access control, supply chain and inventory tracking, car

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charging, security, production control and asset management. Radio Frequency Identification (RFID) is a wireless communication technology that can identify specific targets and can read and write information about radio signals that do not detect mechanical or optical communication between the system and specific targets. We believe that RFID is likely to have a significant impact on a broad variety of business functions, in particular manufacturing, logistics, and marketing and sales. In this survey paper, we present some insights how the technology can be applied in a variety of industries. We also offer operational and strategic guidelines for organizations to improve their expected return on investment. By now there are a great number of applications and industries using RFID in an effective manner. We will not be able to cover all of those in this paper and therefore refer the reader to some related work. The growing importance of RFID is reflected by its inclusion into the main categories of e-business as presented by Gupta et al. The passive RFID tag is capable of operating without its own power source, which receives power only from the scanner signal. Such labels are smaller than the active ones, lighter in weight, cheaper to manufacture, and have an unlimited service life - this is their main advantage.The conditional disadvantage of the passive RFID tag is that the reader requires a sufficiently high power. The active label is distinguished by the presence of an internal battery or the need for an attached battery. The radio signal is transmitted through a radio frequency electromagnetic field and is transmitted from a tag attached to the element for automatic detection and tracking of the object. Some tags receive energy from the electromagnetic field detected by the identifier and do not require a battery. In addition, the tag has a single power source and can actively propagate radio waves (electromagnetic fields adapted to the radio frequency). The label consists of electronic data that can be detected within a few meters. Unlike barcodes, the radio frequency tag does not have to be on the line of sight of the identifier, but it can also be set to the object being searched[2].

Many networks use radio frequency identification technology. Incorporating the tag into machine production can easily track machine movement on the factory production line. The reserve can monitor the location of medicines. RFID tags can be added to pets and pets to facilitate positive identification of livestock and pets (active identification means not allowing the use of the same identifier of the same animal). RFID identification cards allow employees to access locked building parts, and frequency transponders in cars can also be used to collect toll roads and parking fees.Our own practical insights are based on a number of case studies, focusing on the concrete benefits of RFID technology in manufacturing. All of the companies we surveyed see considerable potential for RFID. RFID is expected to lead to increased automation, especially in data capture, and therefore to a reduction in labor costs. Improved tracking and tracing may lead to a more stable manufacturing process with interruptions in the production process becoming less frequent. This should help to reduce downtimes, to lower error rates, and to cut down on production waste. Tracing faulty parts and processes in the wake of a complaint or an accident is becoming much easier. Given the increasing demands on product liability, this is likely to create major competitive advantages for early adopters. In container management, RFID can optimize the scheduling and help to reduce shrinkage. Using RFID for the uniform labeling of shipments may lead to considerable savings in labor and hardware. RFID on the shop floor will help to cut down theft and allow more sophisticated presentations of the merchandise to the customer [3].

Some radio frequency tags are added to clothing, personal items, and even the body. Because this technology can read personal information without my permission, this technology undermines personal privacy concerns. The electromagnetic wave received

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by the RFID tag from the antenna activates it and it becomes possible to write data to the tag and read data from the tag. Thus, the antenna serves as a multifunctional communication channel between the transmitter and the tag, which provides complete data transmission and reception processes. Semi-passive RFID tags, also called semi-active, are very similar to passive tags, but are equipped with a battery that supports the chip. However, the scope of these tags depends only on the sensitivity of the reader's receiver, and they may have longer distances and better features. Passive systems of this range are inexpensive and are used for subcutaneous labels in the dismemberment of animals and humans according to their physical properties. However, due to the wavelength, there are problems with long-distance reading as well as collisions during reading. For a long time, there were no chips that fully met these requirements.

Antennas of different shapes and sizes can be placed on scanners, doors, turnstiles, various means to work with RFID tags to provide access to information stored on the tags of goods, objects, people, vehicles, etc. - total, browser antenna coverage moving across the zone and placed on top of the RFID tag [5].

The antenna can operate continuously and constantly read a large number of tags, constantly interrogating them, or can be turned on by the operator for a while. An antenna with a transceiver and decoder is often housed in a single common housing so that the signal from the antenna is immediately demodulated, encrypted, and transmitted to a computer via a standard interface for later processing.

Ideal RFID systems used in product lifecycle should satisfy high confidentiality, anonymity, integrity and high availability (Gao et al., 2004; Pisarsky, 2004). The product life cycle is a procedure that the product from manufacture to be recycled. This procedure from the perspective of commerce can be divided into five stages(Figure 1): (1)&(2) are the stage of "production to retail store" (business-to-business), (3) is the stage of "retail store to customer" (business-to-customer), (4) is the stage of "individual sales" (customer-to-customer), (5)&(6) are the stage of "after-sales service", and (7) is the stage of "recycling" (reverse logistics). Since a tag is embedded in the product, security risks such as privacy threats may be occurred in each stage of the product life cycle [6].

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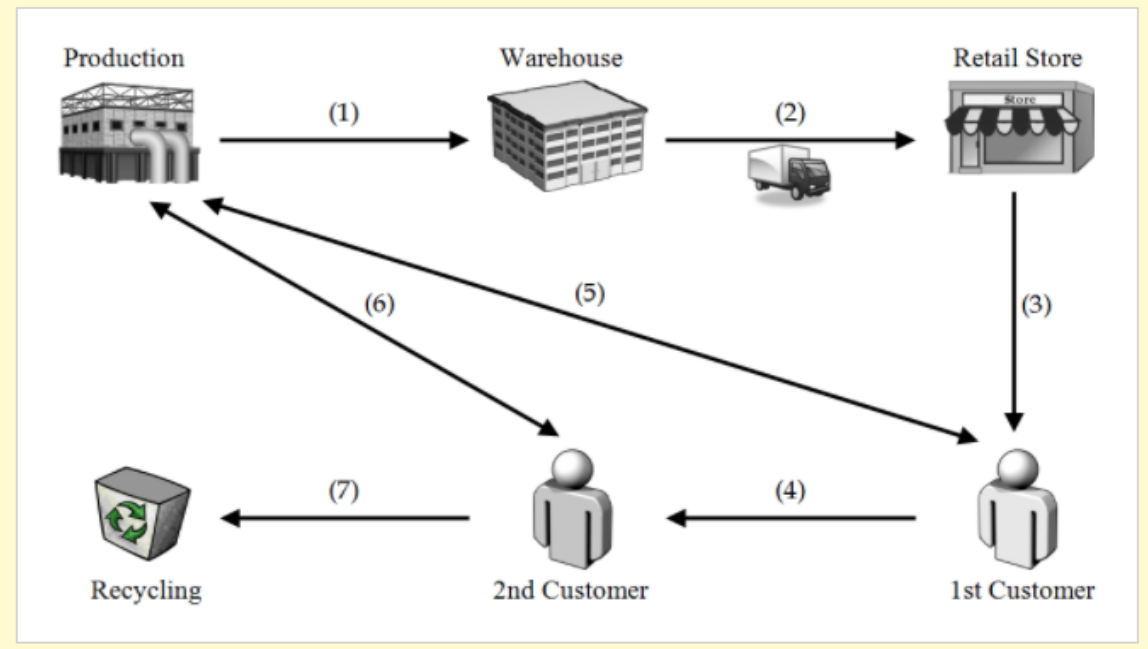

Figure 1. The product life cycle.

To our desirable point, researchers need to pay more effort to develop object identication throughout the life cycle with guaranteeing the corporate and personal privacy, illegal tracking, unauthorized profiling, impersonating, cloning, and illegal reading/writing. This article is not purpose of an exhaustive literature survey but summarizes some aspects of RFID authentication and access control in the proposed studies.

Thanks to the development and implementation of automated control systems, the work of modern enterprises has reached a new level, which until recently was a major weakening in the arts. The problem is completely solved by the problem of speed and description, speed and accuracy of data to the management system in collection, trade, transportation and other fields. Principles Radio frequency detection technology (abbreviated RCH) was successfully applied during World War II. It then allowed it to automatically identify the aircraft ("their strangers". Thus, this technology has acquired new features over time, but based on modern approaches. Contactless identification is the convenience of recognizing and registering objects. meets the requirements of a computerized control system used for transmission. The system is based on the use of the principle of barcodes and radio frequency (RFID technology), in which special tabs are set on the object, identification and other information [7].

Construction and function are not actually presented to something unique and difficult. Everything in the system is very simple: the system must have three main components:

- the reader (reader) from whom the data were collected;
- identifier - can be in the form of a map, tags, buttons or tags;
- computer information system.

Analysis of the relevant literature

Manage rfid access to items on the internet Due to the lack of scientific work of scientists in the field, we decided to study this topic, which led to our ban on scientific news and research on this topic for the world community. Depending on the application of the industry and the development of the industry, the RFID system can be very complex and the practices in place can vary greatly. In concept, the RFID system can consist of three subsystems, as shown in Figure 2: converts to a supported workflow and (3) Inier-enierprise subsysiem.

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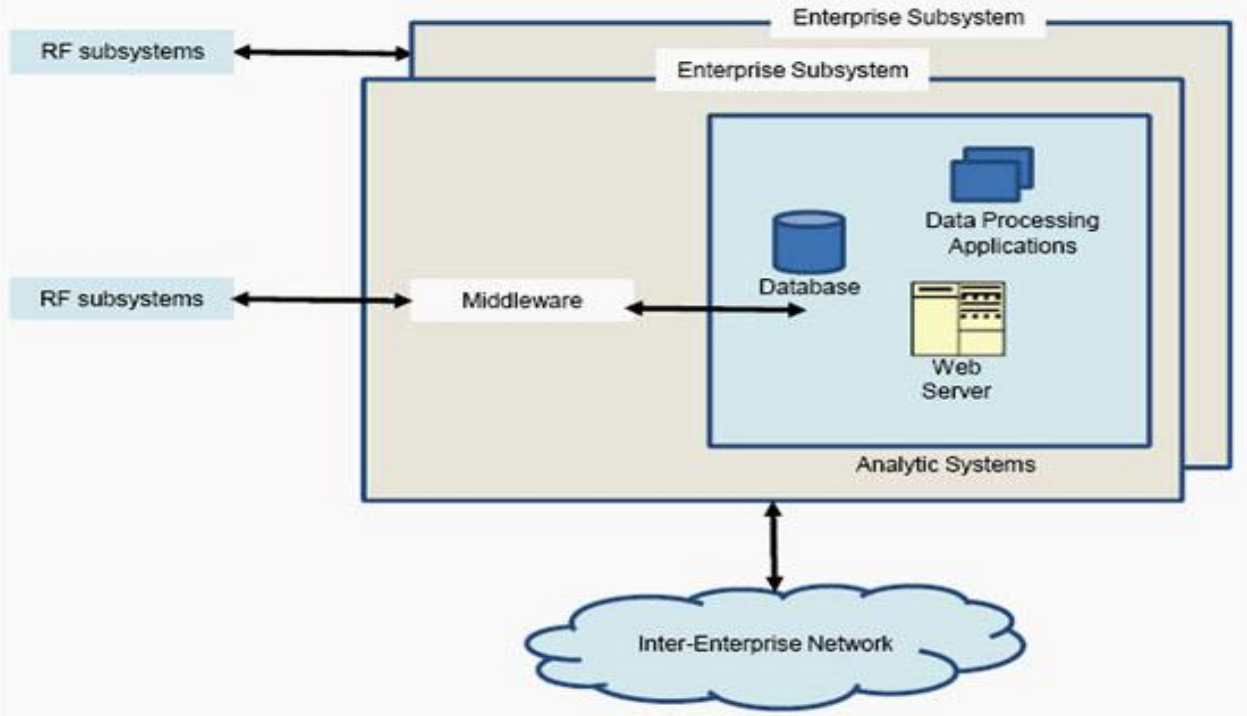

Figure 2.Inter-Enterprise Architecture

The use of RFID tags has caused serious controversy, criticism and even a boycott of goods. Here are four key issues with the privacy of this technology:

The customer may not even know about the presence of RFID tags. Or they can't delete it;

The information on the tag can be read remotely without the owner's information;

If the specified item is paid by credit card, the unique identifier of the label can be clearly combined with the buyer;

The EPCGlobal labeling system creates or enables the creation of unique serial numbers for all products, although this can cause privacy issues and is unnecessary for most applications.

The main concern is that sometimes RFID tags remain in working condition even after the product has been purchased and removed from the store. And they can then be used for tracking and other purposes not related to the inventory function of the tags. Short-distance reading can also be dangerous, for example, if the read data is collected in a database or when a thief passes by a potential victim, a pocket is opened to assess the "wealth". 'uses the bird. Serial numbers can provide additional information even after lit RFID tags are detached from the product. For example, the tags of re-sold or donated items can be used to establish a person's social circle.

Some security experts confirm the use of RFID technology against people based on the risk of identity theft. For example, a human attack in the middle allows an attacker to steal identity in real time. At this point, RFID tags, due to resource constraints, are theoretically impossible to protect them from such attacks, as they require complex data transfer protocols.

The ability to read remotely RFID tags is a concern for people's safety. For example, a thief can unknowingly count an RFID key from its access part. You don't have to pick up your key to do that [8].

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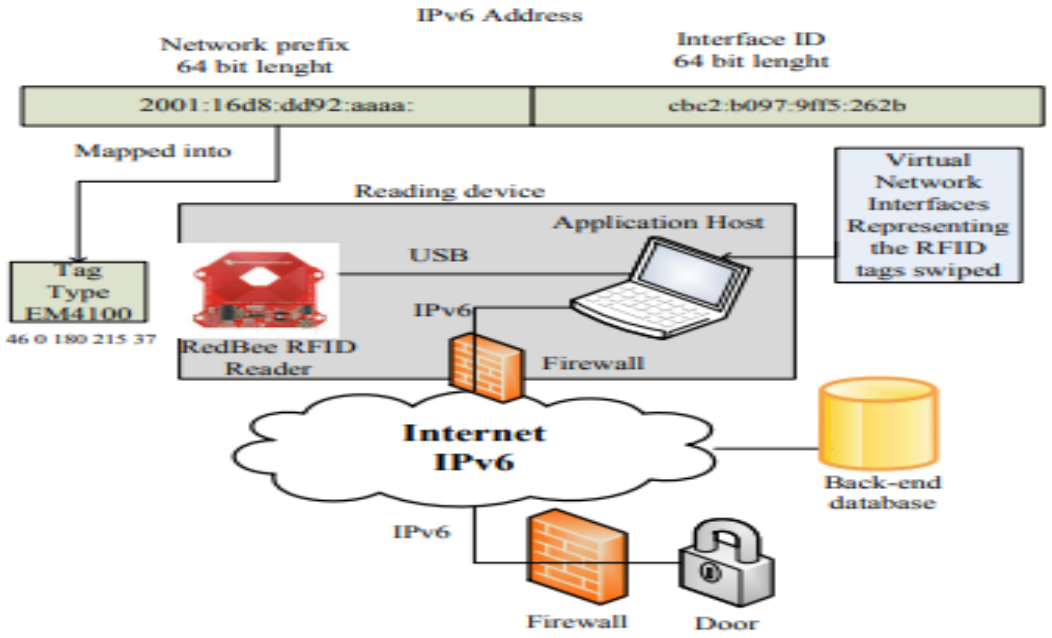

Figure 3: Testbed for networked, passive RFID tags. The tag here has the identity: 46 0 180 215 37.

To study the internetworking of objects with passive RFID tags, a simple test bed has been built as depicted in Figure 3. The approach makes use of an RFID reader and an application host that acts as a proxy for the tags we wish to communicate with. Together this is labeled: reading device. The proxy is capable of making a virtual representation of the passive RFID tag on the Internet by creating a Virtual Network Interface (VNI) with an IPv6 address that can be attributed to each tag that comes within the electric field of a reader. Hence, the tags do not terminate IPv6 traffic directly but merely communicate with an entity that represents the tag (physical object) that we wish to communicate with. The reading device communicated with a central database residing in the Internet.

The thief's student may be in a bag, pocket, or in clothing, furniture, and so on. Just bring the masked reader closer to your bag or pocket in a second. RFID key. This can be done on public transport, on the street. No one will even touch your belongings and the key has already been moved.

It is very difficult to duplicate the exact same tag when talking about a keychain or card. But the thief is not interested in seeing your key. And RFID tags (keys) are very easy to copy the signal is not very difficult. If it is the size of a suitcase that repeats your label, it will still open at your entry point.

When it comes to payment systems, not everything is simple (data on payment cards is encrypted), but you may run into a problem as well.

Some cities use RFID cards to pay for travel on public transport. In these systems, data is not only read from the card, but also written to the card. That is, if not used, at least the data stored on the card can be damaged. This can cause some inconvenience to one person and lead to congestion for the whole city.

Impossible or difficult to read illegally RFID tags, you need to shield the antenna RFID tags. We know that metal objects and metallized surfaces prevent the passage of electromagnetic waves. Also, the presence of water can, in theory, complicate the passage of electromagnetic waves.

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3 Research methodology

In exploring the effectiveness and efficiency of RFID applications, we consider the eight key processes , that make up the supply chain management process. These processes provide a framework for various aspects of strategic and tactical issues present in the management of the supply chain. These eight processes and their functions are described as follows:

(a) Customer Relationship Management: Provides structure to customer relationship and how such relationships are developed, maintained, and managed. Identifies target customer groups as part of the business mission and develops agreements with key accounts. Performance reporte also measure profitability and financial impact for key customers.

(b) Customer Service Management: Provides customer information such as shipping dates, product availability, and real-time information between customers and the firm.

(c) Demand Management: Balances the customers' requirements with the firm's supply capabilities. This would include forecasting demand and managing the demand in production, procurement, distribution, and in all other outputs of the company.

(d) Order Fulfillment Management: Provides integration of the firm's manufacturing, logistics and marketing plans. This would require the management of partnerships maintained by the company to meet customer requirements.

Analysis and results

The RFID section is responsible for reading the tag number and looking for that number in the database of valid records. A valid or invalid entry results in a unique trigger for the MMS section. This section contains the following hardware components:

1) RFID Tag: The user is issued a passive IPC80 RFID tag operating at 125 kHz. The tag transmits unique 64-bit information to the reader in ASK format.

2) RFID reader: Uses an IP10 proximity card reader with an operating frequency of 125KHz and a reading distance of up to 4 inches. The reader can be easily installed on metal doors, provides tag information consistently in RS232 format and is suitable for both indoor and outdoor use . One such RFID reader communicates with an AT89C52 microcontroller on the Rx pin via a MAX232 chip.

3) EEPROM: Parallel EEPROM 2864 is connected to the microcontroller at points P0 and P2 to store valid tag numbers, unknown numbers and red numbers. These are three lists that have been allocated different sections of memory. The memory provides 8KB space that can store about a thousand 64-bit numbers. In this paper, only ten numbers are preloaded into a section of memory called valid tag numbers, while the other two sections are empty at startup .

4) UART voltage level converter: RFID reader outputs data that cannot be directly connected to AT89C52 microcontroller. Therefore, the MAX232 is used as a voltage level converter between two components.

5) Microcontroller: This is the heart of the RFID section, which is responsible for reading RFID tag data and generating signals for the MMS section based on comparison. The 8-bit microcontroller has 8K bytes of flash memory, 256 bytes of data memory, six interrupt sources and 32 I / O lines. The microcontroller is programmed in C using the keil µ-vision development platform[9].

Figure 4 Problems and importance of RFID in supply chains of firms. Infernal processes and independence in firms, as well as external variables such as secrecy, privacy, and security standards, play

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a vital role in managing RFID efficiency and effectiveness.

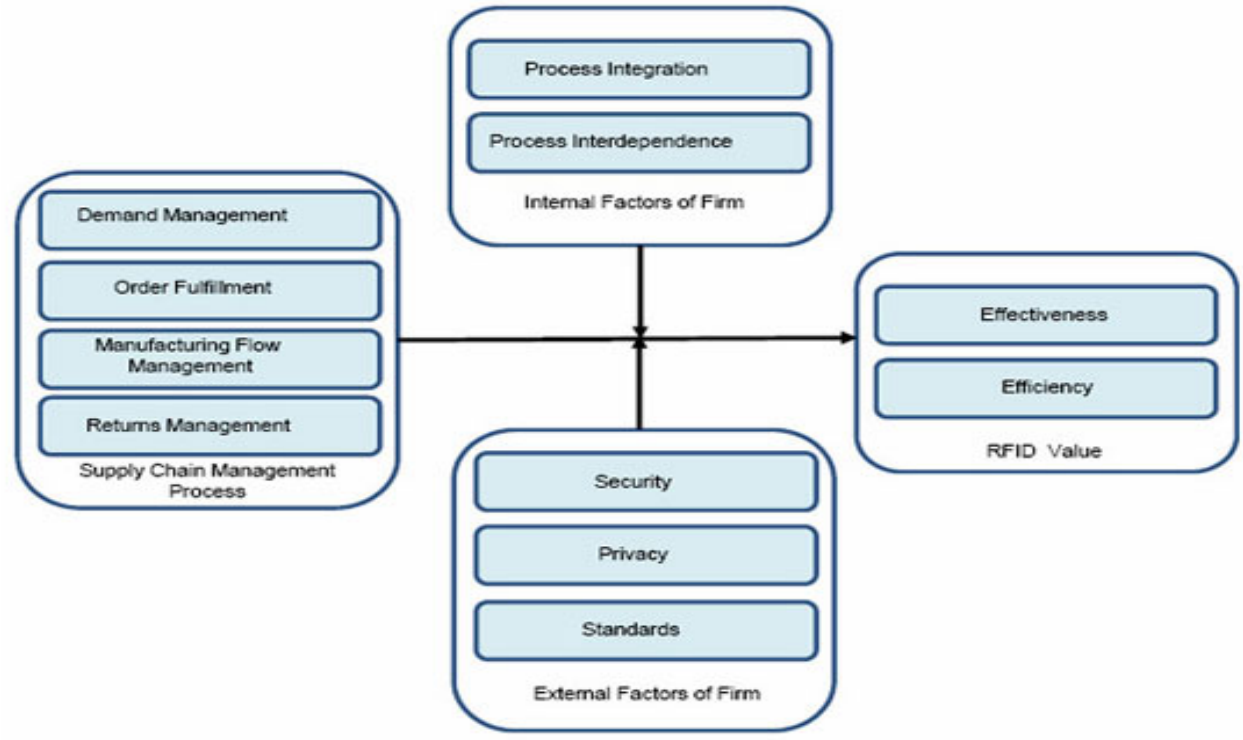

Figure 4.RFID VALUE IN SCM

The most popular is the medium frequency range. This is an optimal response for traffic and other similar applications that require you to work with rewritable characters. The basic standard in such systems is ISO 14443. This applies to almost all smartcar cards. There are EPC and ISO 15693 standards for labels used in this range. The latter is used in the production of rewritable labels with a wide range of functional capabilities. EPC (electronic product code) is characterized by a simple structure and is an electronic barcode Adagogy [10].

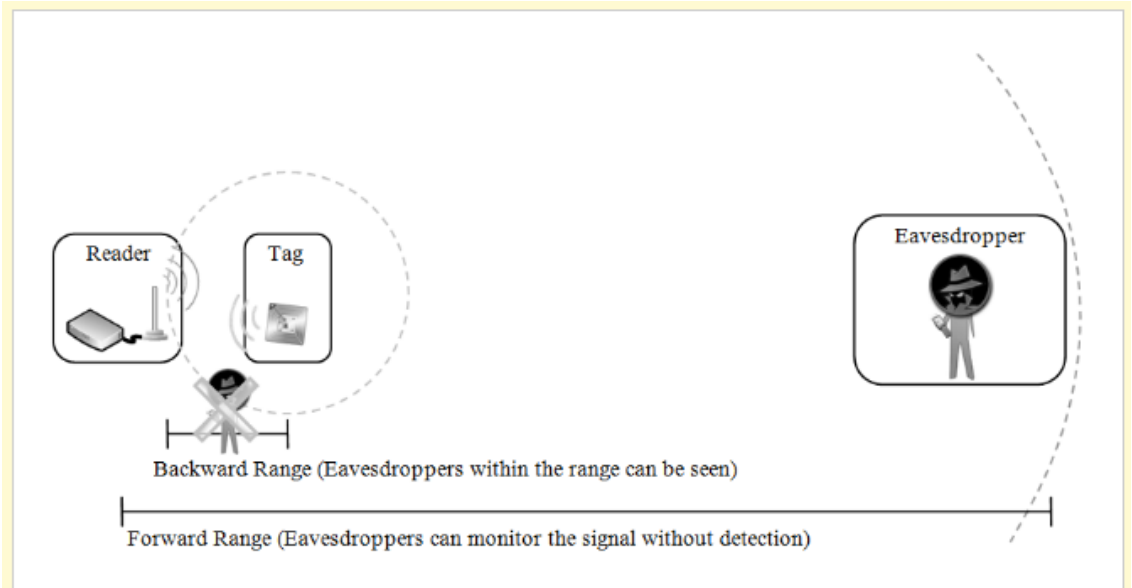

Figure 5. Forward vs. backward channels

As the relationship is illustrated (5) in Weis's paper (Weis et al, 2003), the forward channel (reader-to-tag) is assumed to be easily monitored by an adversary since the signal broadcasted by the reader is strong enough, the backward channel (tag-to-reader) is relatively much weaker and may only be monitor by an adversary within the tag's shorter operating

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range. The reader-to-tag (forward) channel and the tag-to-reader (backward) channel are assumed not secure, but eavesdroppers may only monitor the forward channel without detection.

The high-frequency range isn't that great, but it's interesting because the radiation power in it was passive identifiers from 4 to 8 meters, which was convenient for warehouse applications. The two most common standards in this range are: ISO 18000 and EPC. It should be noted that the EPC Standard is the most promising, especially promising, for medium frequency and high frequency ranges, especially for logistics applications.

Overcoming technical problems related to the development of an international standard in RFID systems, the working group within the major manufacturers of the International Electricity Committee (IEC) and the International Organization for Standardization (ISO). This group is developing international RFID standards for product management. A special subcommittee that is part of this working group retains the stamps of the successor barcode in. In general, the RFID working group includes 4 subgroups: Data Syntax, Application Requirements Candidate, RFID tags, and radio interface. All of them are aimed at developing international standards to solve common problems in the use of RCH systems, they think about the connection and operation of the radio frequency tag and its control system and the tag and Information readers. The result of these subgroups should lead to the development of a number of international standards in terms of compatibility of components of radio frequency components from different manufacturers.

RFID systems to facilitate selection According to their functional capabilities, the development of standards is carried out for several frequency bands: 433 MHz, 13.56 MHz, 865 - 960 MHz, 2.45 g azt and I135 Khzz. It is assumed that radio frequency identification systems based on frequency data can meet all the needs of their users. This is done with the development of international standards with the coordination of the National Standardization Bodies involved in the process. The International Organization for Standardization provides six stages of coordination at different levels. The projects developed today allow us to understand that overcoming the most difficult part of its path is a sign of the creation of international standards for international standards in the near future [11].

Currently, the standards of the ISO 18000 series are of the greatest interest, the main features of which are listed in the table (Table 1).

Table 1

iso 18000 rfid rfid standards

Standard rfid	Name	Main content
ISO 18000-1.	Part 1: Defining parameters for standardization.	Definition of standardized parameters
ISO 18000-2.	Part 2: Air Interface Communication Bell 135 Xz	Parameters for offline communication interface below 135 kHz
ISO 18000-3.	Part 3: Parameters for Air Interface Connections 13.56 MGsim	Parameters for 13.56 MHz non-contact interface

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ISO 18000-4	Part 4: Parameters for Air Interface Connections 2.45 Parameters at GGZ	Parameters for the 2.45 connectionless interface
ISO 18000-6	Part 6: Air interface connection parameters at 860-930 MHz	860 - 930 MHz Parameters for contactless communication interface
ISO 18000-7	Part 7: Parameters for active air interface connections at 433 MHz	Parameters for a non-communication interface with 433 MHz

Advantages of RFID technology:

- the carrier is not required to collect data, view directly, or communicate with the reader;
- RFID tags provide fast and accurate data collection;
- radio frequency labels are suitable for use in aggressive environments and can read paint, dirt, water, steam, wood, plastic, etc .;
- passive RFID tags are characterized by unlimited service life;
- RFID tags allow you to encode large amounts of data;
- RFID tags are difficult to counterfeit;
- RFID tags can be used not only to read but also to record information.
- RFID technology is relatively widely used in cold systems.

Today, most offices and businesses use contactless plastic cards, such as proximity to use. Initially, based on this technology, this decision was very expensive, but very expensive compared to popular magnetic maps. Due to the convenience and reliability that RFID provides, fast proximity cards are very popular and have competitive market-driven technologies that have been used in access control systems for several years. Most of the students and cards in the Sund function in the passive mode of the 125 koft range. In particular, the norms in this area are still, but the most popular and common forms of companies, hidden and widespread formats, i.e. the most popular and widespread formats are considered. Recently Smart Cards ISO14443 Standard (13.56 MHz), the advantages they provide, as well as the availability of these cards in many countries are already in mass action. There are many kinds of RFID access systems. However, they all work based on this basic concept. This doesn't mean there are no differences from system to system. Not every system is compatible with one another. For example, some systems use various levels of frequency bandwidth. Access control systems often use low-frequency (LF), high-frequency (HF), and ultra-high frequency (UHF) bandwidth. LF is defined as being between 120 and 1355 kHz. HF is between 3 and 30 MHz. UHF, meanwhile, is between 300 MHz and 3 GHz [12].

7 Conclusion

In this paper, an access control system based on low-cost, passive RFID tags is described. The RFID tags identity is used to assign IPv6 addresses to objects that can be used as identification for access control applications. With the proposed approach it is possible to represent objects virtually online by using a Virtual Network Interface (VNI) concept. The chosen address format includes a hashing technique that forms a cryptographically generated address (CGA). This address is globally unique in a statistical sense and can be used for communication over the Internet. Furthermore, the IPv6 address space is considered large enough for making all viable objects in the Internet of Things addressable. A future reader architecture that is based on network layer technology with packet filtering mechanisms is suggested. Tests have been shown that it is possible to make an access

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control system based on firewalls and IPv6 enabled passive RFID tags. In this study, we have examined the effectiveness and efficiency of supply chain management in using RFID. We have also thoroughly examined appropriate business processes affected by RFID technology. Using four major supply chain processes, we highlight economic opportunities and challenges when planning and implementing RFID technology within an existing supply chain framework. RFID technology enables an organization to significantly change its business processes, not only to increase its efficiency which results in lower costs, but also increase its effectiveness, i.e. improving mission performance and makes the implementing organization more resilient and better able to assign accountability, as well as responding to customer requirements to use RFID technology to support supply chains and other applications. As discussed earlier, RFID offers significant strategic valué potential for companies in developing an integrated model of supply and demand chain to drive revenues and innovation and to gain competitive advantage. Companies that implement the appropriate business processes to leverage the data collected by RFID and its conversión to information and intelligence will accelerate these benefits. As companies develop their RFID strategies, they must look beyond mere compliance for ways to implement these initiatives into their total supply chain strategy and harness the true business valué of the technology, hastening profits.

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