REVIEW PAPER ON SECURITY ISSUES, APPLICATIONS OF RFID

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Abstract: This paper consists of RFID technology which is used within many places such as electronic ticketing, Road tolling, tracking pallet, work within progress, IT asset management etc.It consists of two areas of major security concern & various kinds of attacks which could be possible within front end & back end such as Denial of service attack, tracking, spoofing, viruses, replay & sniffing & eavesdropping. Due to its informational infrastructure RFID could be used for surveillance purposes & several people therefore fear a surveillance state. We have also discussed application areas of RFID such as Logistics & Supply Chain Visibility, Item level inventory tracking, Race timing, Attendee Tracking, RTLS (Real Time Location System).

Keyword: RFID, Microchip, antenna, Trojan, active attack & passive attack, Sniffing & eavesdropping

[1]INTRODUCTION

RFID is a wonderful technology which is widely used within many areas. Some of areas of application are environment, supermarkets, toll-collection, supply-chain management. However it is also known as "advanced bar code system" is known as advanced because cases of bar-code we need exactly line of sight but within case of RFID we do not need any line of code. As distance between reader & code increases its power decreases.

We could broadly classify within to three main categories. These are passive   ,active & semi-passive. We could also classify passive tags further on basis of frequency we use within this technology low frequency passive, high frequency passive , ultra high frequency passive & battery assisted passive tags.

Fig 1. RFID SYSTEM **Fig. 1.** The RFID system.

This figure shows that RFID system consist of three parts database, reader & tags.Database is place where all information is stored within database reader is instrument which is used to read data here. Tags are used to place within product to which we want to track. RFID tag consists of:

- ➢ antenna
- ➢ battery
- ➢ case
- ➢ microchip

It provides a survey on radio frequency identification (RFID) technology. Initially RFID tags were developed to eventually replace barcodes within supply chains. The paper describes current technology, including frequency ranges used & standards. With increasing ubiquity of RFID tags, however, privacy became a concern. The outlines possible attacks that could violate one's privacy & it also describe counter measures. The RFID technology did not stop at item-level tagging. Since uses for RFID tags are so widespread, there is a large interest within lowering costs for producing them. It turns out that printing tags might become a viable alternative to traditional production. Various types of tags which are used within
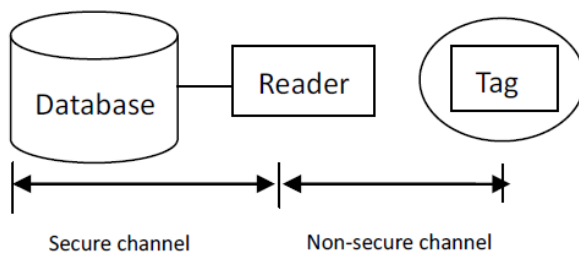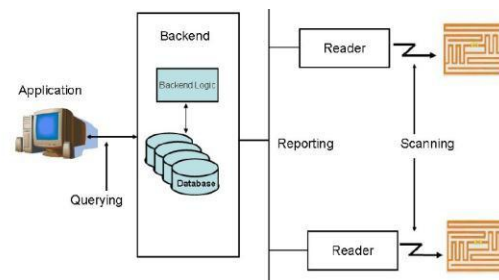

Fig 2. Simplified RFID SYSTEM

RFID readers scan tags & then forward this information to backend.This backend consist of database & well-defined application interface. When backend receives new information it adds to database.

[2] LITERATURE REVIEW

1 Kamran AHSAN1, Hanifa SHAH2 & Paul KINGSTON3 wrote on" RFID Applications: An Introductory & Exploratory Study" within IJCSI International Journal of Computer Science Issues, Vol. 7 Issue 1, No. 3 January 2010 ISSN (Online): 1694-0784 ISSN (Print): 1694-0814

The paper considers RFID technology is a way to provide new capabilities & efficient methods for several applications. For example, in the heathcare, access control, analyzing investory information, & business processes. RFID technology needs to develop its capability to be used with computing devices.This study enhances adoption of location deduction technology (RFID) within a healthcare environment & shows importance of technology within a real scenario & application within connection with resource optimization & improving effectiveness. However, there is no doubt within future that many companies & organisations will benefit from RFID technology.

2 Chengshuang Sun, Fan Jiang School of Management, Harbin Institute of Technology, Harbin wrote on"Research on RFID Applications within Construction Industry" within ChinaJOURNAL OF NETWORKS, VOL. 8, NO. 5, MAY 2013

Radio Frequency Identification (RFID), also known as electronic tags, is a communication technology using radio signals of different frequencies for identifying a specific target within real-time without any direct contact or line-of-sight within harsh environments. Unlike bar codes, RFID tag offer abilities of reading, writing, storing, transmitting, & updating information.In recent years, due to promotion of function & sharp decline of cost of RFID tags Construction industry is an important pillar industry, & is essential to promote national economy & social stability. With social & economic development & advent of information era, scale of

construction projects & amount of information attached are becoming larger & larger, & construction project management is becoming more complex & highly dynamic. The increasing needs to know real-time location of resources, such as people, equipment & material, have been rapidly expanding within construction site [4]. The traditional management means is far from being able to meet needs of modern large-scale construction projects. RFID technology is endowed with great expectations to provide timely & accurate location information & strengthen construction project management [5][6]. Early within 1995, Jaselskis et al. [7] envisaged its potential applications within construction industry, including concrete processing & handling, cost coding for labor & equipment, & materials control. Since that, a few more studies have been conducted to explore potential applications of RFID within construction industry.

3 Elisabeth ILIE-ZUDOR1, Zsolt KEMÉNY2, Péter EGRI3, László wrote on THE RFID TECHNOLOGY & ITS CURRENT APPLICATIONS within MONOSTORI4 1-4Computer & Automation Research Institute, Hungarian Academy of Sciences Kende u. 13–17, Budapest In proceedings of The Modern Information Technology within Innovation Processes of Industrial Enterprises-MITIP 2006, ISBN 963 86586 5 7, pp.29-36

INTRODUCTION Although foundation of Radio Frequency Identification (RFID) technology was laid by past generations, only recent advances opened an expanding application range to its practical implementation. The data carrier is a microchip attach to an antenna (together called transponder or tag), latter enabling chip to transmit information to a reader (or transceiver) in a given range, which could forward information to a host computer. The middleware (software for reading & writing tags) & tag could be enhanced by data encryption for security-critical application at an extra cost & anti-collision algorithms may be implemented for tags if several of them are to be read simultaneously. As an alternative, researchers from Helsinki University [7] have proposed notation ID@URI, where ID stands for an identity code, & URI stands for a corresponding Internet address.

4 SCIENTIFIC PUBLICATIONS OF THE STATE UNIVERSITY OF NOVI PAZAR SER. A: APPL. MATH. Wrote on "RFID" inINFORM. & MECH. vol. 4, 1 (2012), 39-52

RFID (Radio-Frequency IDentification) is a technology for automated identification of objects & people. Ableary-eyed person could easily pick out a cup of coffee on a cluttered breakfast table within morning, for example. RFID may be viewed as a means of explicitly labelling objects to facilitate their –perception‖ by computing devices. [1]Of course, Germans had also taken advantage of cover that darkness provided. Early Identification Friend or Foe(IFF)systems made it possible for Allied fighters and anti-aircraft systems to distinguish their own returning bombers from aircraft sent by enemy. At RFID Journal Live 2010 within Orlando, Airbus detailed 16 active projects.

5 SER. A: APPL. MATH. Wrote on "RFID Security and Privacy: Threats and Countermeasures" in Marco Spruit Wouter Wester Technical Report UU-CS- 2013-001 January 2013

The vulnerability of Radio Frequency Identification (RFID) and the objection of consumers to buy products that include non-protected RFID are holding organizations back from investing in this promising technology.We conclude that RFID security and privacy developments are very promising but do require more development iterations.

6 Steve Hodges and Duncan McFarlane wrote on "Radio frequency identification: technology, applications and impact" in AUTOIDLABS-WP-HARDWARE-016

Radio Frequency Identification or RFID has sprung into prominence in the last five years with the promise of providing a relatively low cost means for connecting non electronic objects to an information network. In particular, the retail supply chain has been established as a key sector for a major deployment of this technology.A range of applications is reviewed and we conclude with some

comments on the likely societal impact of RFID and potential barriers to deployment. This report

[3] SECURITY ISSUES

The main problem within using this technology is mainly security concern. This technology consists of problem that it could be easily hacked by hackers. So while using this technologywe have to face this type of problem .So this technology we are using has various kinds of attack could be possible like viruses, Trojan, active attack & passive attack.

1. Sniffing & eavesdropping: Most systems use clear text communication for various reasons like too few resources for encryption, too expensive to implement, problems with distributing keys for some schemes, etc. In those systems sniffing is a powerful attack as it could reveal a lot of Information for eavesdropper. Also simple RFID tags do not provide any protection against being read by a misbehaving reader. The learned information could later be used within other attacks against RFID system.

2. Tracking: This exploit tries to collect & relate as much information as possible.Especially when item-level tagging becomes ubiquitous it becomes possible to create a precise profile of a person. That results within a loss of privacy.

3. Spoofing: In this attack scheme an attacker could read data from an authentic tag & copy it to ablank tag. Since most tags do not provide some kind of authentication or access control an attacker could simply read tags of passing people & save them onto a blank tag for later use gives an example of a spoofing attack. The attacker reads tag's data from an item at a store & create a new tag that replaces tag for a similar but more expensive item. The retagged item could then bechecked out & attacker will only be charged for cheaper item.

4. Replay: In this attack attacker intercepts communication between a reader & a tag. At a later time original tag's response could be reused when attacker receives a query from reader. The implementation of a challenge-response protocol could prevent those attacks.

5. Denial of service: This attack could have many different forms. One form is by simply jamming service provided by frequencies.

6.Brute-Force Attack: A brute-force algorithm to find divisors of a natural number *n* would enumerate all integers from 1 to n, & check whether each of

them divides n without remainder. A brute-force approach for eight queens puzzle would examine all possible arrangements of 8 pieces on 64-square chessboard, and, for each arrangement, check whether each (queen) piece could attack any other.

While a brute-force search is simple to implement, & will always find a solution if it exists, its cost is proportional to number of candidate solutions – which within many practical problems tends to grow very quickly as size of problem increases. Therefore, brute-force search is typically used when problem size is limited, or when there are problem-specific heuristics that could be used to reduce set of candidate solutions to a manageable size. The method is also used when simplicity of implementation is more important than speed.

This is case, for example, within critical applications where any errors within algorithm would have very serious consequences; or when using a computer to prove a mathematical theorem. Brute-force search is also useful as a baseline method when benchmarking other algorithms or metaheuristics. Indeed, brute-force search could be viewed as simplest metaheuristic. Brute force search should not be confused with backtracking, where large sets of solutions could be discarded without being explicitly enumerated (as within textbook computer solution to eight queens problem above). The brute-force method for finding an item within a table — namely, check all entries of latter, sequentially — is called linear search.

7. Viruses: This targets backend of database.

One should kept within mind all these things to design a good system:

1. Nominal reading range: This is range specified by this standard. It is range within which a sender Conforms to standard could communicate with tag.

2. Rogue reading range: This is range for which a modified sender could communicate with tag. The

3. Modifications could include: sending a signal at higher power than standard specifies or having a High-gain antenna or antenna array. Needless to say that those modifications could increase range dramatically.

4. Tag-to-Reader eavesdropping range: Here misbehaving reader listens to back scattered signal. When tag is queried by another reader. Note that misbehaving reader is passive within this case. Thisrange is larger than rouge scanning range since reader does not need to power tag which is Usually read-range limit.

5. Reader-to-Tag eavesdropping range: Here misbehaving reader listens to signal sent by reader that queries tag. That signal could be read from several kilometres away since reader has to Provide a strong enough signal to power tag. Note that misbehaving reader is passive again. This Range is larger than previous one. A misbehaving reader that is able to observe Tag-to-Reader Communication could also observe Reader-to-Tag communication, therefore getting a full transcript of communication.

6. Detection range: This is range where it is possible to detect presence of a tag or a reader. At this range it is not possible to capture any intelligible information. However, that might not be needed. The detection range for a reader is much larger than for a tag. An example where this range matters is given now: As described earlier DOD requires item-level tagging. Now a missile could be developed that locks on to a reader or tag signal. Even though this example is far from real it shows that this range cannot be neglected.

[4]SOCIAL IMPLICATIONS

People using technology feared that hackers may not misuse personal information code consists due to its security issues, but if we could improve security then we could make use it within any field for tracking location & whole work process of any system which is very much beneficial within this field. It is blessed technology for one who cannot present on location but want to monitor whole situation.

[5]RFID APPLICATION

RFID is a versatile technology & could be used within a wide range of applications, wherever there is a need to automatically identify items.

Examples of application are:-

- Electronic ticketing within public transport where gateways read tickets of frequent travellers, charges them for each trip.
- Road tolling, similar to ticketing.
- Tracking pallets & other returnable package.
- Security guard patrol monitors, by providing check within points where guards RFID tag is used to record time at which they visited each point.
- Manufacture work-in progress control. IT asset management.
- Identify equipment for plan or preventative maintenance.
- Tracking specimens for experiments

- ➢ Ensures all items required for a particular task are present (configuration management)
- ➢ Audits that regulatory inspections are carried out when required.

Logistics & Supply Chain Visibility

Winning within supply chain means increasing efficiency, reducing errors, & improving quality. In chaotic manufacturing, shipping, & distribution environments, real-time data on status of individual items provides insights that turn into actionable measures. With visibility provided by RFID, you'll be on your way to Six Sigma Master Black Belt status within no time.

Item level inventory tracking

Tracking assets on item level is beneficial across a broad cross-section of industries, but retail sector has one of highest ceilings within terms of opportunity from use of RFID. As mentioned above, tracking items through supply chain is wonderful, but now think about tracking items through supply chain all way to point of sale.

Race timing

Timing marathons & races are one of most popular uses of RFID, but often race participants never realize they're being timed using RFID technology, & that's a testament to RFID's ability to provide a seamless consumer experience.

Attendee Tracking

If you've ever managed a large conference before, you'll know that it's key to keep flow of traffic moving at a steady pace, especially within & out of seminars. With an RFID attendee solution, eliminate need for registration lines at entrances.

RTLS (Real Time Location System)

In some applications, you need to track real-time location of assets, employees, or customers. Whether you're measuring efficiency of worker movements, effectiveness of a store floor plan, or tracking location of valuable resources, RFID systems provide visibility within any number of locations.

[6] CONCLUSION

This is all about this technology. This technology is used in many fields. It has some advantages & disadvantages. Beside this technology is used where

it suited most. It has many security issues & threats beside that we cannot ignore benefits of using this technology however efforts are being put within this technology so that we could improve security within front end security within front is main issue of concern.

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