Course on E-Business
By Prof. Mamata Jenamani
Department of Industrial and Systems Engineering
Indian Institute of Technology Kharagpur
Lecture 40 Automatic Data Capture using RFID and Its Application (Contd.)

Now we continue our discussion last class we saw that how you can automate the warehouse operations using this RFID technology so many of the ones the data is collected you can have a decision support system to guide the material handling equipment throughout the warehouse to pick up the item.

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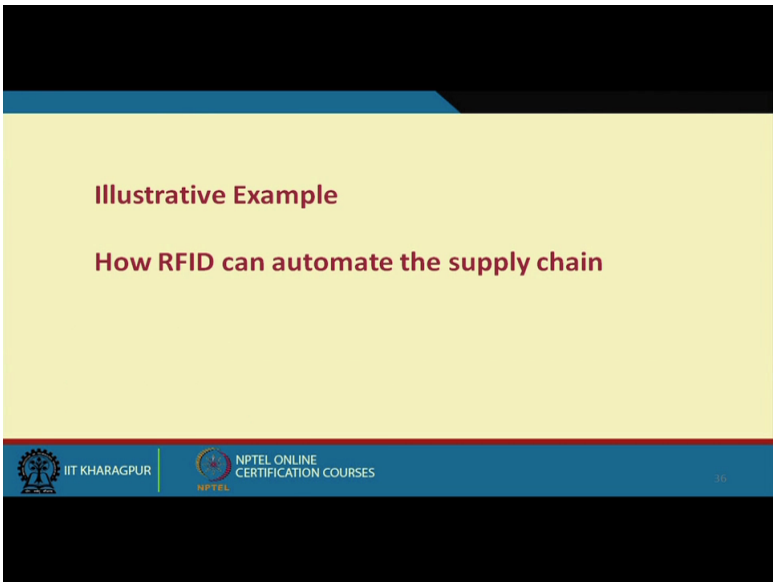

Now as I told you the situation is different in case of a supply chain.

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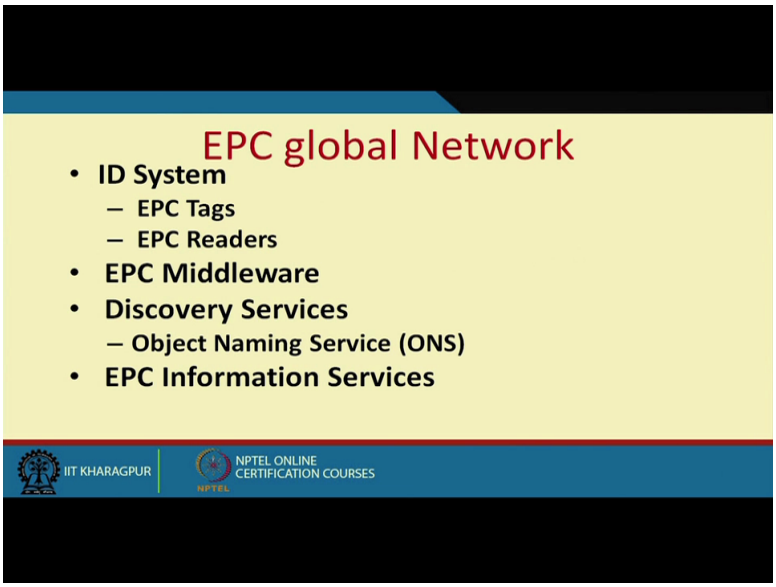

In case of a supply chain you need the support of EPC global network. Now this EPC global network as we have discussed in last to last class it it has four important element one is the ID system this which content this tag detail and EPC reader and we have EPC middleware and discovery services and then we have a EPC information service.

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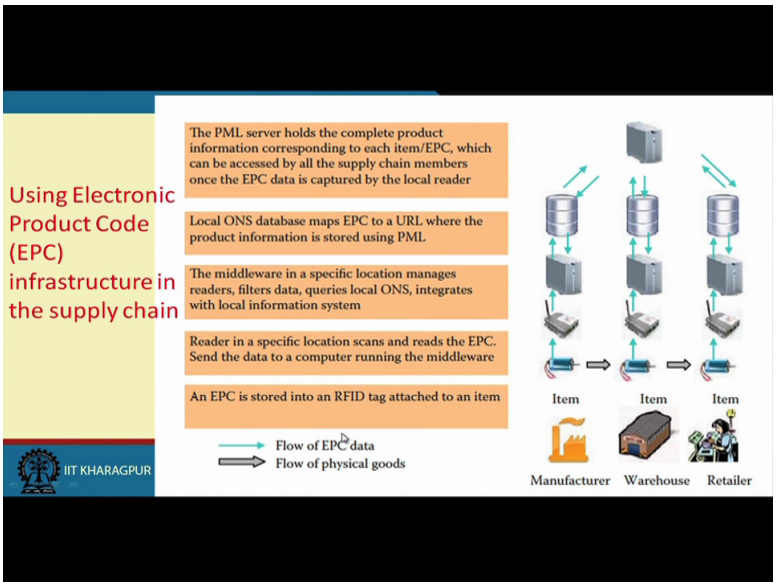

To remind you further as the items move along the supply chain this details see in a warehouse suppose this is a warehouse. Warehouse with in the warehouse once the items are there it is about taking the decision regarding the movement of the items within the warehouse but now the situation is different we have other members as well.

So how do now now it is a question of data sharing and this EPC infrastructure as we discussed in one of the classes earlier class 2 classes earlier EPC infrastructure is actually responsible for making this Information sharing proxy possible so with this infrastructure in place where the item details are stored in this in this final PL PML server is accessed by the warehouse is accessed by the retail store and so on. Now what all things can happen because of this data sharing.

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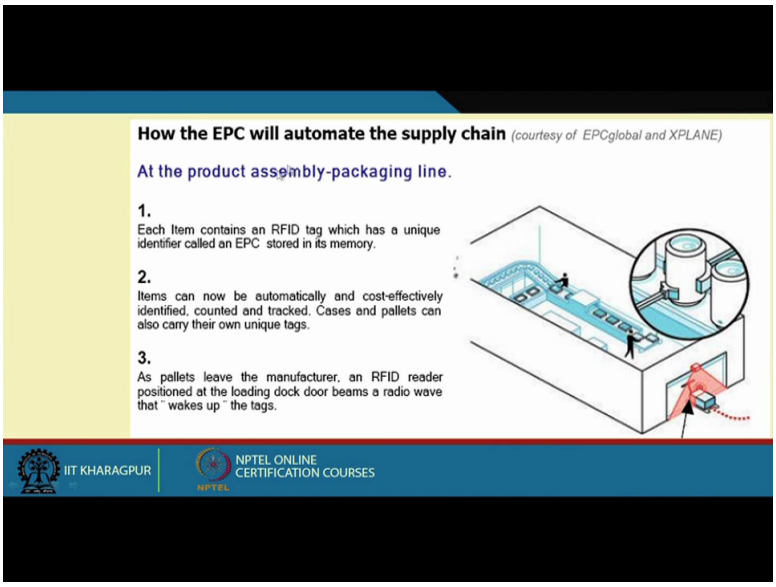

Let us look at first of all when we're talking about the item label tagging each item contains an RFID dag tag that has unique identifier that we know and this EPC is this details are stored in the memory of that tag memory of that tag so therefore the items can now be automatically and cost effectively identified and counted and tracked cases and pallets can also have their own tags.

And they can also be counted now as the this is a situation at the manufacturers end where the products are getting manufactured or getting assembled and packaged now as the pallets leave the manufacturer and RFID reader position on the loading dock door look here once the truck moves out entire items which are there inside the truck can be read at once and as I told you this can be used to prepare advanced shipping notices.

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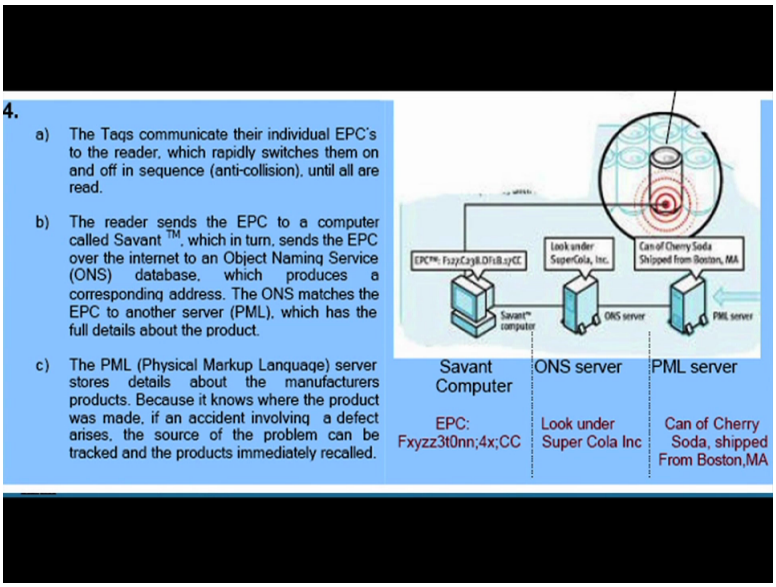

Next when this items are moving out as we know this tags communicate their individual EPC to the reader at the dock door that we saw.

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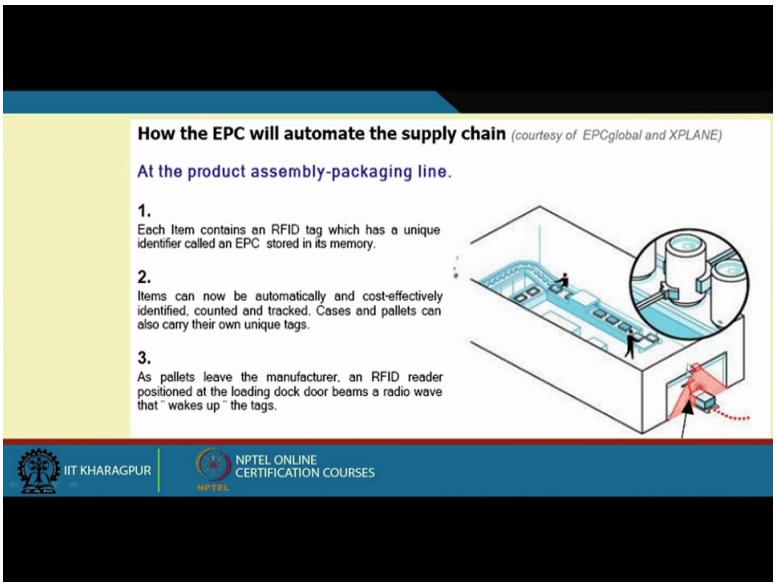

At the dock door it is sending to the reader.

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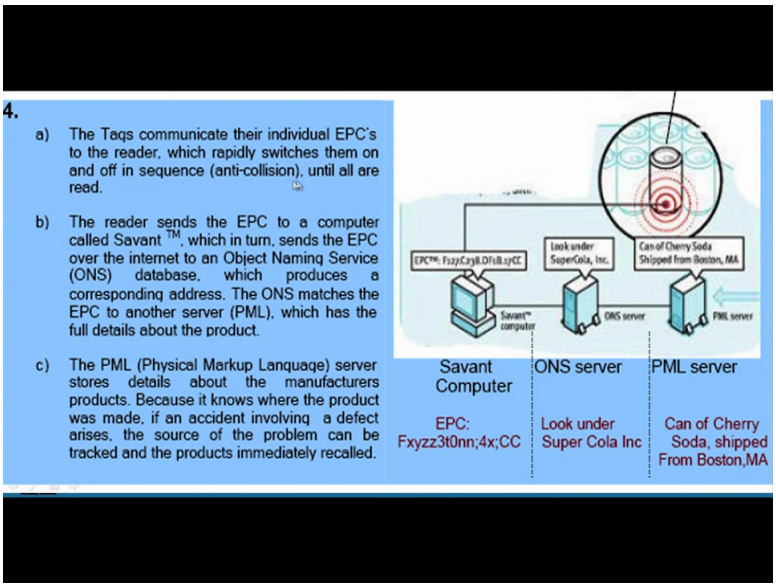

Which rapidly switches them on and off in sequence until all of them are read which means in fact I have already told you we really do not read it I mean the the reader in fact you may have multiple readers as well the readers themselves can also be error prone so therefore once you read the reader read the items by the reader to validate that you have to make multiple reads.

That is what is said here you have make multiple reads or get the data from multiple reader and finally filter it out finding the what is the right code and this right code is after all a code so to know that it is to to which item it belongs some mapping has to be done now this readers sends this EPC to a computer call savant which in turns send the EPC over the internet to the object naming service or ONS database.

Which produces the corresponding address so with respect to a code of internet address a URL fetched using this object name name naming service so once this URL is fetched next task is any supply chain member can access this PML server physical mark up language server and the specific URL of that particular server to know the item details.

So here for example if this the product code when the server says that you look it it gives a (())(6:16) specific URL that you look it under this particular companies data now PML server actually takes the details that it is a can of cherry soda it is shipped from Boston MA and so on.

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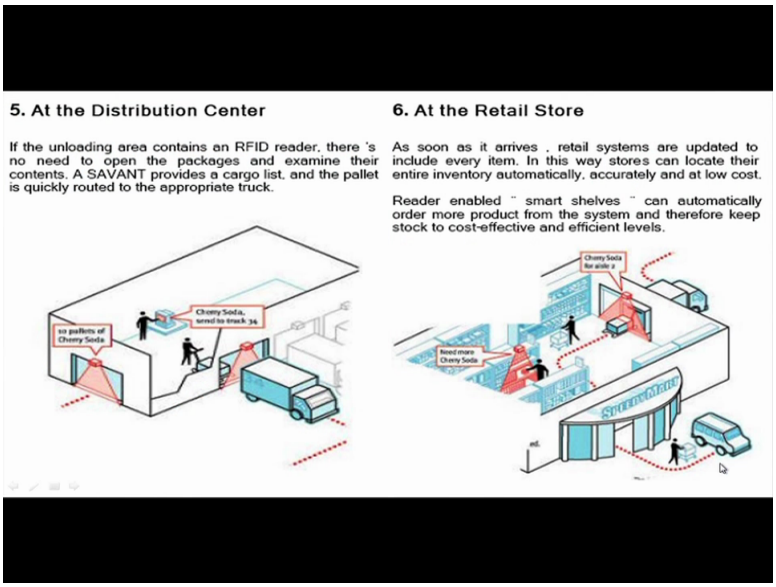

Next at the distribution centre if the unloading area contains an RFID there is no need to open the packages and examine their content a savant provides a cargo list and the pallets and the pallet is quickly routed to the appropriate truck this is what we also discussed at the time of while talking about the RFID in Warehouse next in the retail store.

Now as soon as the pallets arrived at the retail store systems are updated to include every item once it enters to through the to the store the truck that item centres to the store there automatically red then the shelves in the retail store can also be smart with RFID Technology if you have this smart shelves they can automatically order more products from the system and therefore keep the stock to cost effective and efficient level.

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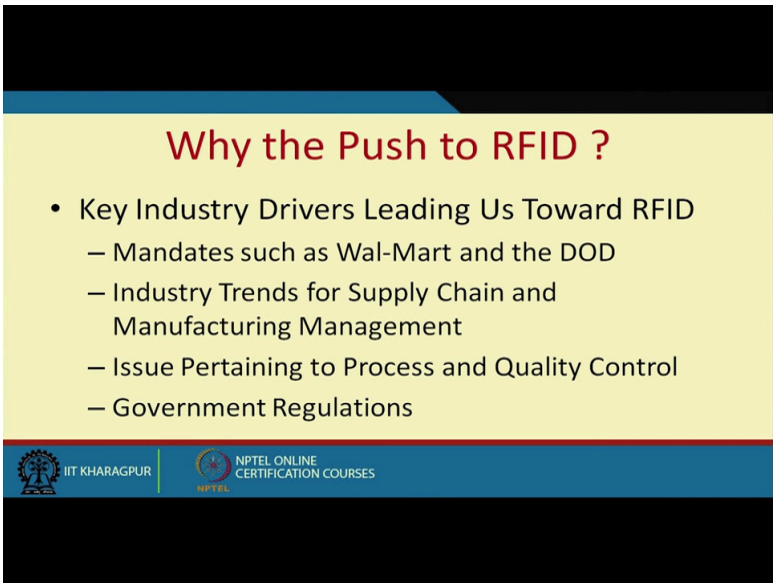

Now let us try to see where there is a push to this RFID technology in fact the drivers to adoption of this RFID technology in supply chain are walmart and department of defence of the US both of them enforced they are suppliers because both of them are very powerful powerful buyers so therefore they are capable of enforcing their supplier to use this RFID technology initially the cost on this tags readers (())(8:37) all this equipments used to be very high in fact around 2003 4 when this walmart.

And DOD mandate scheme that time technology was very costly and most of the suppliers where quite reluctant in fact they were not able to find out the benefits that is coming to them by the use of RFID they where only knowing that only the retailer like walmart or the user like department of defence will be the beneficial but at the time progresses this the cost of tags.

And other equipments are (())(9:16) equipments are going down along with that others members of the supply chain they are also able to discover what value RFID can bring them then RFID simply provides the data now what about the quality control product is tagged product is going what if the product quality is not good RFID cannot give that data in fact of course.

The solutions to that are also coming up there are sensors for of course for every product sensors may not there but for many products sensors are there who can actually collect the quality data as well. So the issues (())(10:08) of this process and quality control was another

enabler then government regular (())(10:13) so government also came up with this mandates on risibility etc that is another push to RFID.

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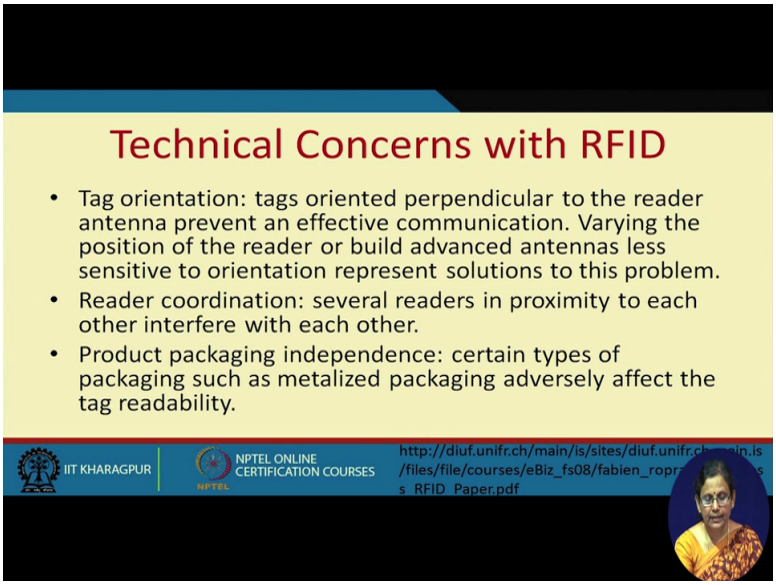

Then there are many technical concerns with RFID first is RFID technology though bit ease a better technology than that of barcode it is not a full proof technology either there are some technical concerns as well for example first concern is tag orientation this tag orientation means tag orientated perpendicular to the reader antennas prevent and effective communication.

The varying the position of the reader or building advanced antennas less sensitive to orientation present in solution to this problem then second problem is reader coordination now several reader in proximity to each other may interfere with each other with each other as a result of this collision data will be I mean the data that you collect will not be proper then product packaging and independence certain type of packaging such as metalized packaging adversely affect the tag readability.

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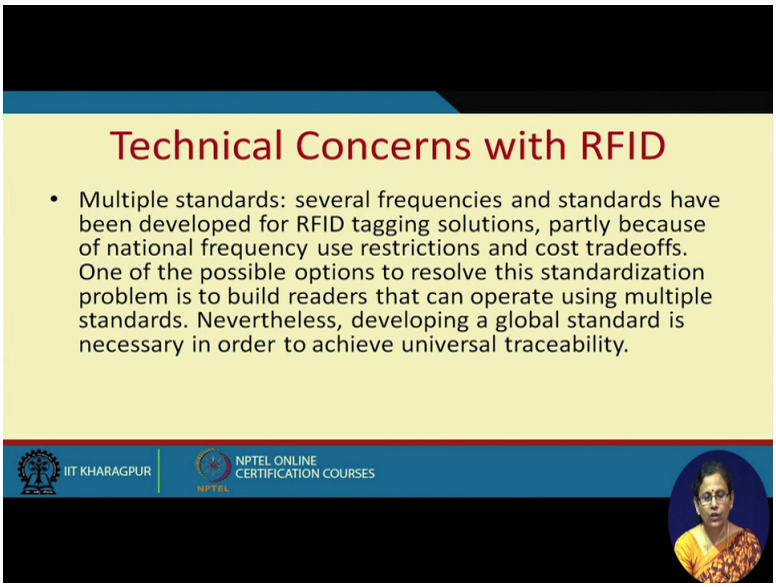

Then across the globe in different countries the frequency range provided for this RFID kind of applications are bit different so there are several frequencies and standards have been developed for RFID tagging solutions this is partly because of the national frequency used restrictions and cost tradeoffs now one of the possible options to resolve this standardization problem is to build reader that can operate using multiple standard. Naturally such multipurpose readers reader antennas will be little bit costly.

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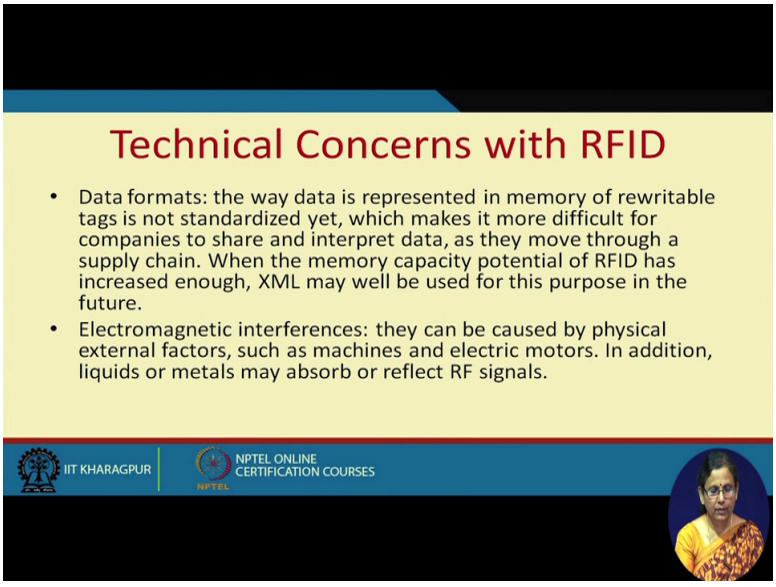

Than second concerns is with that of data format the where the data is represented in the memory of a rewritable tag is not standardized yet which makes it more difficult for

companies to share and interpret data as they move through the supply chain it becomes more and more difficult when the memory capacity potential of RFID are increased enough XML may be used for this purpose.

But right now this not an option of course beyond this EPC details the tags with come with some additional memory in fact situation is much better now they come with additional memory and that can be used to keep additional information but it is not as big as putting an XML file because because after all in this EPC infrastructure information infrastructure the data about the product is kept in a remote server not in the tag tag tag contains only code.

Then next electromagnetic interference they can be caused by physical external factors such as machines, electric motors in fact in addition to this this liquids and metals they can also absorb and reflect radio frequency signals .

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There are concerns on privacy and security as well in privacy in the context of privacy RFID makes it possible to gather the sensitive data about the individuals without him being aware of how about the individual? When the customer buys some product from your store he carries the product and along with the tag so if he has to be tracked it is enough to track the product because he carries the product.

So therefore privacy of the person is lost now security there are many hand held handheld devices as well so if somebody will like to track you then you can very much do that then

next is your security concerns the major risk with RFID risk with RFID issues from low processing speed.

And low memory tags especially the passive tags is they are very weak for cryptographic operations so therefore whatever items are stored in your store their details can be known to anybody working in that having the RFID readers and following the specific standard.

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So besides this concerns RFID is a very promising technology and these concerns are of course increasingly handled by researchers but RFID to wind it up RFID is aggressively getting adopted in supply chain in fact now most of the high value products that you buy comes not only with RFID if you are little careful if you just lift the lift the barcode tag you may find below that there is a RFID circuit thank you very much!