

Systems analysis and Design
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Lecture - 33

Last time, we were looking at business to business E-commerce and looked at our familiar example, which have been using all along.

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Business To Business E-commerce

- Purchase order entered by business1 in its PC and electronically dispatched to vendor (by e-mail)
- Vendor acknowledges electronically the order
- Vendor dispatches goods(physically) and delivery note electronically to business1

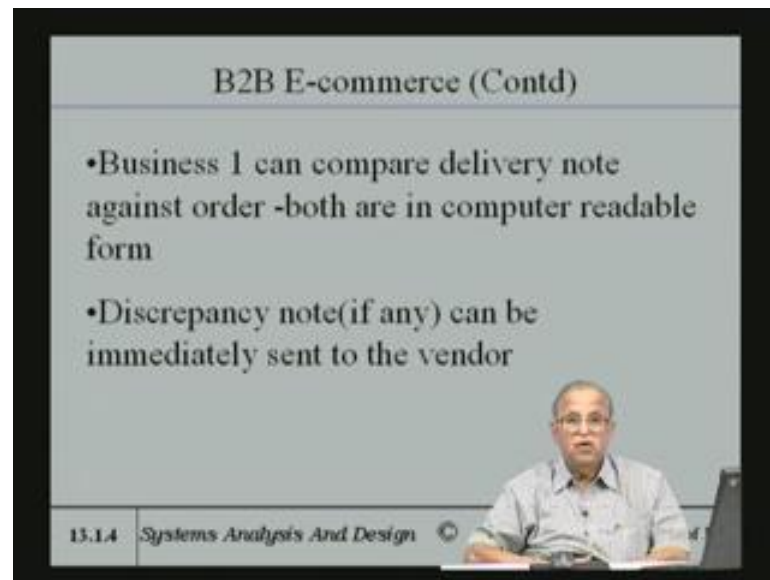
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Namely, there is a vendor, who supplies items to a purchaser. And the purchaser in the case of electronic commerce both the vendor and purchaser has their own intranets or local area networks. And both are computerized and both are connected by a communication line. Normally, public switch telephone network.

And or sometimes private dedicated line or now a day's is something called virtual private networks is coming, which is on the internet. So, VPN's are also another way of interconnecting to businesses.

Now, the first purchase order is entered by the business, which wants to purchase items, in it is own PC. And it is electronically dispatched to the vendor by E-mail. Vendor acknowledges is the order electronically. The whole point is that, everything is on the electronic speed and communication lines. And the vendor dispatches the goods physically, by a truck or train or what have you.

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B2B E-commerce (Contd)

- Business 1 can compare delivery note against order -both are in computer readable form
- Discrepancy note(if any) can be immediately sent to the vendor

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And then, the when the business, which the purchaser essentially compares the delivery note, which came by along with the items. Physically, against the order both, because the original delivery note would also, would have come by electronic mail. Apart from the physical delivery note. So, he would normally compare the electronic delivery notes.

So, that comparison is very simple. But, during inspection the hand written one or typed one or whatever, would also be used. Because, ultimately as I said inspection is to take place before acceptance. And discrepancy note if any can be immediately sent to the vendor.

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B2B E-commerce (Contd)

- Business 1 can carry out all local transactions using its LAN
- Local transactions are inventory update by stores - advice to accounts to pay for goods taken into stock
- Accounts can make payment electronically to Vendor

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That is with the comparison of the delivery note, with the purchase order can be compared electronically. And immediately, you can send reply or if there is any discrepancy to the vendor. And he can also immediately reply saying that, may be I made a mistake or whatever. Or say, some items are coming later on, may be the next consignment in a day or two whatever.

And as because both the businesses have their own LANs, the purchaser of business one as we can call, it can carry out all local transactions, using its own intranet or local area network. And local transactions are inventory update by stores, advice to accounts to pay for goods taken in to stock. All those things, which we had in the data flow diagram of the example, though in the data flow diagram. We actually showed the documents, as documents flowing within the boxes.

In that case, the circles which are in the processes. And the same thing is ((Refer Time: 04:45)) except that, there is no physical paper movement. There is only purely electronic, electronic message movement, you might say or local electronic mail within the organization. So, for instance as soon as the inspection, accepts the items, based on inspection.

The accepted items and details of that is electronically sent to the stores. So, stores can automatically update. And as soon as they update their inventory, they can send in turn note, saying this much of stocks have been taken into inventory. And now you can pay

the vendor. And now the accounts department can in fact, even pay. But, the vendor electronically.

By actually, sending the money by electronic bank transfer to the bank account of the vendor. So, these all becoming possible. Because, banks are also connected to a network. And there is also of course, other payment methods like cheque payments, electronic cheque payments and so on, will cover, later on in this set of lectures.

So, one simple way of course, is if the bank account number is given. And you access to the bank, then you can sent to the bank a message. Saying that, electronically you can transfer this amount from my bank account to the bank account of the vendor. These are all can be done electronically, that is the advantage.

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Implementing B2B E-commerce-requirements

1. Agreed on formats for Purchase order, delivery note, payment order etc. Standard known as EDI (Electronic Data Interchange Standard) is used to send documents electronically
- 2 Each Business must have corporate intranet and the two nets are connected by PSTN or leased line

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In fact, the payment becomes very, very fast. And there is no postal delay and stuff like that. There is one a greatest advantage, advantages of E-commerce will later on look at the advantages and disadvantages of E-commerce. Compare to the current method, not I would say lot of business are now converting to E-commerce. And because, of the convenience. And because all large businesses have already intranets, which are working in their organizations.

So, business to business E-commerce is one of the fastest growing segments of E-commerce. Earlier on the segments, which has growing very fast was the b to c

commerce. That also continues to grow with the more and more people buying PCs and PCs working from home. But, B2B is something which is economically, lot more important for businesses to improve our overall functioning. And that is a reason why, B2B E-commerce is growing quite fast.

Because, businesses already have fairly good computing infrastructure, in their organizations. But, there is some prerequisites for this business to business E-commerce. Because, we said that the purchaser sends his purchase order electronically. And the vendor sends the delivery note electronically. And the payment is also sent by the accounts and so on.

So, for all this to happen and for electronic comparison of purchase order against the delivery note. Agreed on standards, which you there in terms of the way in which, the document will be formatted. Because, it is coming electronically, you must know the format. That in other words what is field represents. So, that you can actually do a proper job of reading that and interpreting it and comparing with a delivery note and all these are required.

So, the common formats, which are required are primarily this exchange of data is called electronic data interchange, for that you require a standard. Because, if everybody follows his own technique, then there will be lot of problems. Because, the vendor is not dealing with only one business. He is dealing with multiple businesses, that is in other words whole lot of different purchasers are there.

Similarly, a purchaser may not go to a single vendor, he is going to different vendors. Depending up on which vendor supplies what and which vendor is competitive and so on. So, for each vendor, if he has to use a different format, it will be quiet a what I would say, un necessary work on the part of the purchaser, to be able to send purchase orders in all kinds of different formats to different people.

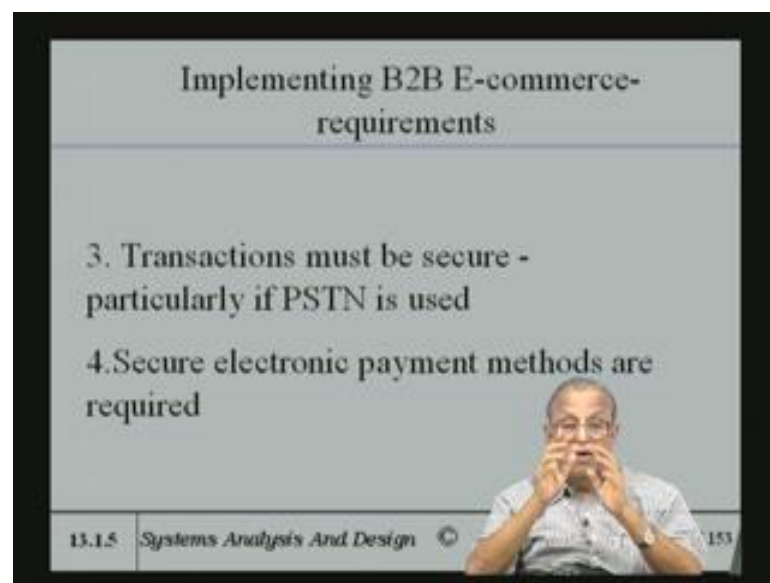
Similarly, the vendor also if he receives purchase orders from multiple purchasers all in different formats, he will have difficulty in interpreting them. So, there is a requirement for electronic data interchange standard to exchange data electronically. And of course, the another ((Refer Time: 10:09)) each business must have a corporate intranet. So, that and then they should be connected by a PSTN or leased line or a virtual private network.

So, transactions must be secure, whatever transactions or all these purchase order, the delivery note, the particularly payments and so on, which go through the public switch telephone network must be secure. Because, public switch network telephone network by definition is publicly available to a lot of people. In other words, it is accessible by large number of different people.

So, when somebody, when different people can access, then they can also eavesdrop. In other words, they can kind of listen and to the transactions that going on between two people. And that, it could be very dangerous. Because, your competitors can really undercut you and things like that. So, there is a need for security.

And security concerned particularly, in a public switch telephone network is used is extremely important in electronic commerce. And that, we later on we look at the great detail about the security issues in E-commerce.

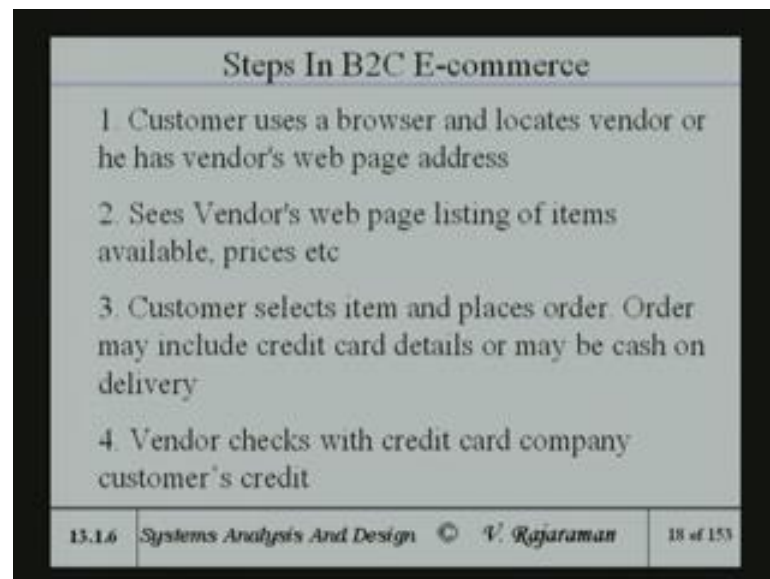
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And similarly, whole and above security is required for documents also. Base besides documents security becomes lot more important, when you talk about payment methods. Payment methods, because money is something which one has to protect, I mean there is always temptation of stealing. Particularly, if it is stealing from your home using a PC and the public switch telephone network, so the internet and so on. The temptation is there for stealing.

And that is the reason why you should really make doubly sure, that any money transactions going on the network. What I mean by the money transactions or transactions such like. Such as, credit card transactions, debit card transactions, cheque transactions and so on. All these different means of transacting with money has to be protected with great amount of care.

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So, that is the way in which the B2B commerce happens. Whereas, in b 2 c commerce is slightly different. Because, here the a business has several customers. And but the business which is selling can kind of impose certain kinds of formats, for ordering. Because, what they will do is a as finded out here.

The customer uses a browser and locates a vendor, say ((Refer Time: 13:14)) vendor using a browser. That user use a browser and if you use you know the unique resource locator. If you have the URL or the website address, you can use the address directly. If you do not know, then you can go to a search engine like Google. And in search engine you can say that if I want to purchase say washing machine.

If your customer buy trying to buy washing machine. Then, it will kind of come up with vendors, who deal with this washing machine. Then, you can sell it one of those vendors. How to once you get the vendors web page, you can look at the listing of items available, prices, brands and things like that, delivery time and guarantees. What all are required by you, before you make a purchase decision, they will all be available there.

And customer selects know you may look at multiple vendors. Because, one vendor may not provide the kind of facilities he requires. So, he may look at the URLs or websites of different vendors. And decide among the vendors to which he really wants to go. Once, he decides of the vendor, he selects an item. And the order is placed in fact, the vendor has got a format of ordering, order format is presented to you on your PC by the vendors website.

And you figure this order format. And the order format, you give the what items you require may be the item code, which is their in the vendors web thing. And the number of items you want to buy, all that you could actually enter in that. And of course, once you do this, you need to have a provide a credit card details to be able to pay for whatever you are buying.

So, there are normally credit card payments, you until the credit card number. And say that you can debit my credit card. You know, you can kind of charge to my credit card this amount. Or some places allows also debit cards, where you can give debit card number and it will be debited to your account.

But, many people are little bit worried about revealing their credit card numbers or debit card numbers on the internet. Primarily, because this difficulty of or the suspicion about the security. And people hacking and finding out your credit card number and so on. So, in spite of the fact, that the lot of security methods, they have been used to protect the data flowing on the public switch telephone networks, internet and so on.

Still. there is a suspicion primarily because often on, you see a report in news paper. About some credit card numbers being stolen and used illegally to debit your account. And then, you get into big hassle with your credit card issuer to tell the person, that you dint really buy it. And you have to be able to prove that you did buy it and all that.

So, you unnecessarily get into all kinds of hassle. And also un unnecessary mental worries for a certain period of time. So, many of the E-commerce vendors today, also provide means of cash on delivery. That is he will send the items, it will delivery ultimately items had to be delivered physically. Even, if there are books, the books have been delivered physically to you.

Or if it is a washing machine, somebody has to bring the washing machine put into your house. Now, we can make the payment by cash or cheque or what whatever with you it is to the person who delivers. So, at the delivery time the money transaction is takes place. So, the money transaction do not take place on the on network. But, essentially a physical payment of cash or credit card, depending upon the amount of money inward.

It is like the VPP post of the post office, where the post office delivers and when they deliver you pay to the post man the amount of the VP plus the VPP charges. So, many book sellers send books by VPP. And ((Refer Time: 18:00)) also many other items, which can be send by post are actually bought by VPP.

So, it is somewhat similar to that. And in fact, cases like customer buying a ticket from theater ticket or a ticket for concert and so on. Very often it is delivered and the money is collected from you. For us they will get extra charge, as for the convenience you have of a booking from your home.

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Steps In B2C E-commerce

- 5. Credit card company OKs transaction
- 6. Vendor acknowledges Customer's order and gives details of delivery date, mode of transport, cost etc
- 7. Vendor orders with distributor who ships item to vendor's warehouse from where item supplied to customer
- 8. Customer's credit card company debits his account, credits vendor's account and sends bill to customer for payment

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But, many case people do not rush this. And particularly people were little cautious do not want reveal their credit card numbers, prefer this cash and delivery model. And of course, if the credit card payment is through credit card. The vendor has to check the credit card company, where the customer has got the appropriate amount of credit in it is account. If there is a appropriate amount of credit with account then; that means, then the credit card company will the transaction.

Just like that the when you present a card in a shop, he puts it he actually swipes it through a little terminal he has. And immediately it goes to the credit card company. And then, it gives an approved. And when it is approved, then only he kind of prints a bill and takes a signature and the transaction is over. So, before the transaction is over, the vendor actually checks with the credit card company.

Whether there is enough credit balance in the account of the purchaser. And the vendor acknowledges customers order. And gives details of delivery date, mode of transport, etcetera. If the payment is by credit card there of course, electronically he will send a reply that, that your order has been approved. Now, it is approved now I have to send you the items. And you will send the items physically and you will say mode of dispatch, expected time of arrival and things like that.

And normally these vendor do not keep the items with them. Because, if for instance denoted a book shop, virtual book shop like Amazon dot com. These all books, these all also music and so on. Like, Rediff dot com in India and also sites variety of items. Now, it is just physically impossible to keep all of them in their ready inventory. Because, a huge inventory cost.

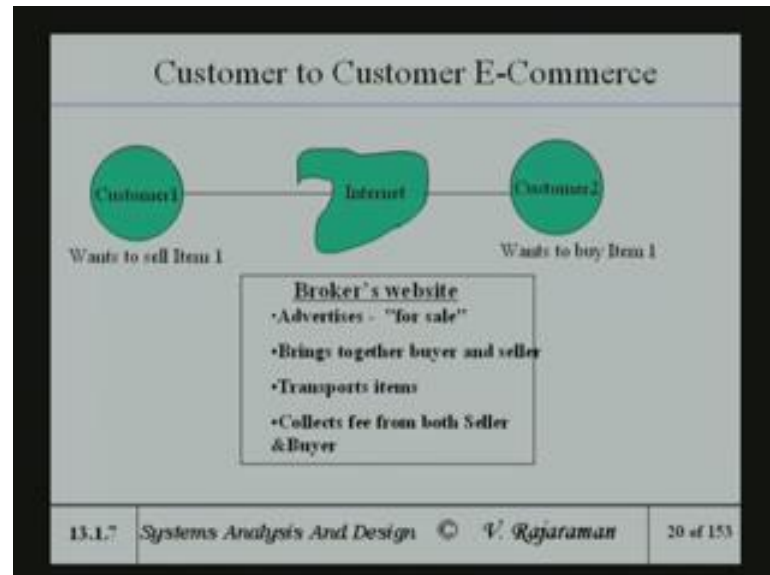
In other words we do not know who is going to buy what and when. So, and also physically storing a huge inventory is expensive. Because, you have to rent that premises and so on. So, what they normally do is that, they ask act as middle man. In other words as soon as they get the order and they approved order, they send a request distributor of the items, who have who keeps the inventory to kind of dispatch the item directly to the purchaser.

And of course, if it is a very fast moving item for instance the particular book is extremely popular, they may keep a few copies with them. And then, dispatched immediately. But, if it is something which is not all that popular, they would effectively go to distributor. So, it depends some models vary from one company to the other, they will always find the optimal mix of what to keep in their inventory. In their own place and what to kind of get from the distributor.

But, buy a large it is a pure business decision on what is to be done. And credit card company of the customer. As soon as the they approves the payment, they will debit his account and credits the vendor account. And the later on the end of the month, the bill be

sent to the customer for payment. And the customer of course, has to pay with the certain stipulated time.

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So, that is the customer to b 2 c business to that is customer to business, you might say. Or there is a or a b to c whichever we does not we matter. Normally, it is one one ((Refer Time: 22:47)). And now it is the other is c 2 c, c 2 c one of the most common or popular examples, all over the world is eBay. Because, eBay is an auction site, which is a customer to customer, E-commerce facilitating site.

In other words, there are internet site which allows two customers. Who both are electronic presence on their PCs to interact through the middle man, you might say. And enables this transaction takes place. And so it is ((Refer Time: 23:31)) call it a broker. So, customer wants to sell some item. And he advertises on sale and puts the many employees, he expects on them.

And purchaser looks at this web site. And he may not be willing to pay, that kind of an amount. And so he will give his own quote. Suppose, your normally in his cases, it is some second hand stuff. Like, for instance you want to get, you know if you want to sell a second hand car. You might say I have got a second hand car, which is 3 years old my asking price is this much.

And the buyer may think that the price is too much. That whatever he can afford he will offer. So, then multiply buyers can also look at this offers. And effectively, if he wants it badly enough he will increase the offer. So, that ultimately the customer will accept this offer, which comes. And then, the effectively what the broker has done is bring together the buyer and the seller.

And now of course, many of these middle man also take care of transporting the item. Also to some extent guarantying, certain quality. In other words, in the sense that suppose you I would have something, which is not ((Refer Time: 25:10)) mark, then the intermedially ((Refer Time: 25:13)) very take delivery to deliver to you. And so these are and also the charges both sides ((Refer Time: 25:20)), which have been offered.

Collects free from both seller and buyer of course, money also. Money transaction may take place in different modes, primarily it is a it could be a cheque payment or cash payment. Because, credit card payments putting customers is somewhat more complicated. So, or unless you pay to the ((Refer Time: 25:45)) in turns pays to you, but that is a little complicated.

So, the customer the big advantage of customer two customer E-commerce is that. And seller you have potentially, if you are going to sell a car or something like that. An India wide customer base it theory of course, in practice of course, normally selling a car, the person will be not in the same town. But, if you sale some other items, which are easy to transport may be it is a large for instance one thing, they people sell are old stamps. Old stamps which are sold, they can be mailed anywhere in the world.

So in fact, your customer can be anywhere in the world, who has only got a internet presence. So, the whole point is that depending upon the item. The customer the population ((Refer Time: 26:43)) you are access to is in the virtually, in many large. Because, you have now virtual presence in the on the net. In fact, this customer two customer E-commerce, when it started people did not think it will progress very fast.

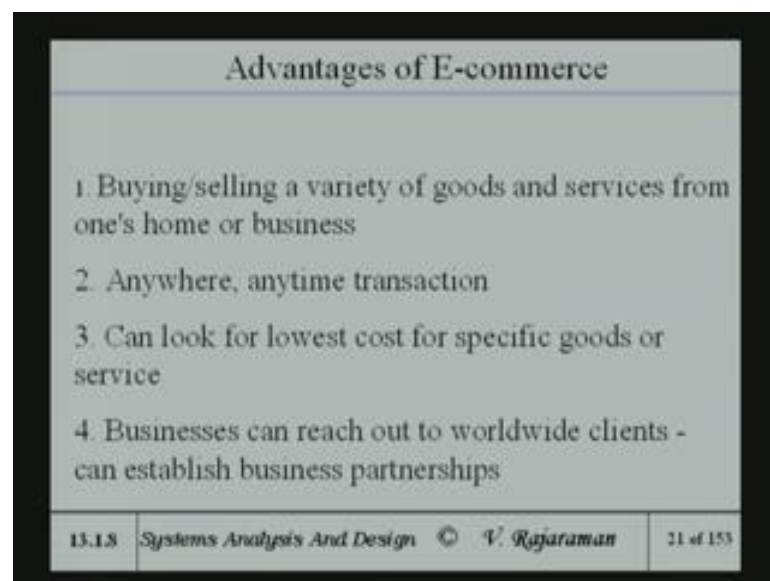
But, now it will become fairy established business. And eBay as an example is a very successful business. And that business module has been of course, mimic by other people. But, being first in the game, they have really continuously improve their services. And so they also have a worldwide presence today, they had a there is a Indian site,

which has ((Refer Time: 27:33)). And eBay has now come to India and they also have presence in China, and all over the world.

So, this is again is a question of you know regardless of where you are located. Whether, you are American company or an Indian company or Chinese company, it depends upon how quickly or how who is the first mover. Who is the first person who thought about it. So, in that first person there is a lot of advantage. And this case eBay is first mover and it personally got the advantage.

And of course, continuously the side improve their services. Otherwise, somebody else can easily get into the same space and beat you. So, one has to be always careful, about the first ((Refer Time: 28:24)) over advantage is there. But, still you cannot be essentially based on, you know you cannot survive on that. You got to continuously improve your services. And understand the customers problems and so on.

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So, the advantages of E-commerce are buying and selling a variety of goods and services, from ones home or business. Convenience is you do not have to kind of do a lot of traveling. And now a day's particularly with the all the traffic jams and so on, so forth it is much easier to kind of shop from your house, without having to go out anywhere.

Anywhere, anytime transaction. In other words, your presence can be anywhere and normally most of the sites are opened 24 by 7. Because, after all they are computer

servers, which are maintained 24 hours a day 7 days a week, they never switched off. So, your virtual shop might say open 24 hours a day 7 days a week, unlike a physical shop which has got some restricted hours.

And can look for the lowest cost the specified good or service. Because, you can look at multiple people who serve these things. And compare and find out the lowest cost. And the businesses can reach out to a worldwide set of clients. And establish business partnerships. In other words, now if you want to buy a book from India, some books in fact, Amazon dot com like a book seller, has a huge inventory of books and sale.

And you also has added a lot of phrase, in terms of reviews, in terms of extract and things like that, to make it easy for you to take a purchase decision. So, how this is made it possible to essentially have a worldwide set of clients. In fact, amazons client, there are plenty of clients in India also, which who order from Amazon. Because, they are not available in many of the Indian book stores.

And of course, you will have to pay for the cost plus the shipping and things like that. It could be a rare book and stuff like that. So, in theory the businesses can be reach out to worldwide client base. And establish business partnerships across oceans. Order processing causes reduces, because everything as I said flows electronically. So, there is no need to enter re enter anything. And everything is compared electronically. So, total cost of processing orders becomes lower.

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Advantages of E-commerce

- 5. Order processing cost reduced
- 6. Electronic funds transfer faster
- 7. Supply chain management is simpler, faster, and cheaper using e-commerce

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Electronic fund transfer is faster, there is because of fact that you can essentially do a direct transfer of money from one bank account to another bank account, electronically. This transfer becomes very fast provided of course, you ensure security. Now, the another interesting thing is so called supply chain management is simpler and faster and cheaper.

What is supply chain management, you know what the point is suppose I am a truck manufacture. I need to buy a number of items from multiple suppliers to be able to make this truck. I buy my tires from somebody, I will buy by steering wheel with somebody else. I will buy the horn from the third party, I will buy my gears from the fourth party. And engine block may be supplied by another company.

So, there are multiple suppliers of the items. And not to make the truck, you have to synchronize all the supplies. And if you have a certain production schedule of say making 100 trucks in one day. So, all the items which are required to make this 100 trucks in that particular day, has to be available and is got to be managed. And of course, by order too much, then my inventory buildup and then, the cost goes up.

So, the supply chain management means I have to be able to schedule my supply my requirements, appropriately to multiple suppliers. And manage the chain from this supplier to me, that too multiple chains, multiple suppliers who have multiple chains. Because, one supplier may be in suppose I truck manufacture, if it is taking place in Pune one supplier may be in Chennai, another supplier may be in Bombay, third supplier may be in Bangalore.

And so there are different suppliers and each one is got a different travel time. Because, these are all physical items, they got to travel by truck or train or what have you. And so the appropriate timing has also I get to be done. Because, ultimately at the truck shop all of them have to synchronize. And come together to be able to truck and without you have to increase your inventory size too much.

So, that management is makes it easier electronically. Because, if you have a regular supplier, you could even kind of give him access to a production schedule. And say that I will require this much, this much, this much on these different days. So, he can also actually schedule his production to meet your requirements of supplies. In another

words, you can also supply gradually as per your requirements. And appropriately produce as per your requirement.

Because, ultimately you to produce he requires raw materials. He also does not want to carry it to the raw materials. So, he can very carefully kind of monitor, the way in which supplies are going to go to the ultimate user. And also in turn go to the suppliers. And ask him to kind of do a an appropriate dispatch of items to him. So, a supply chain means, the fact is a one there is a truck manufacturer, there is a component manufacturer.

And the component manufacturer him selves will need the raw materials or materials from different vendors. Like, he may have to buy screws and nuts from somebody, he may have to buy some electrical coils from somebody else and so on. So, in other words he himself has got a supply chain, so ultimately set of suppliers. So, ultimately there are group of suppliers in all of them have kind synchronize, these what is called supplier chain management.

So, this becomes simpler because everybody is connected electronically. So, each one can correspond very fast electronically. And schedule it very, very effectively to kind of not waste too much of resources. So, in the long run, the total resource saving for everybody improves. That means, total that in fact, in effect reflects itself, in the profitability of all these companies.

And of course, there profit profitability, if they can improve they can also reduce their prices appropriately to kind of have a recent type profit. So, this kind of a possible thing, really helps a customer ultimately with. And also at the same time, helps all the users, all the suppliers and so on. Because, they can do an optimization. And optimization becomes fairly, in other words overall cost of production goes down.

And ultimately it helps a economy of the country or the growth of the country's economy. So, this what is one of the most interesting and important things, which occurs in E-commerce.

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Advantages of E-commerce

- Can order from several vendors and monitor supplies.
- Production schedule and inventory of an organization can be inspected by cooperating supplier who can in-turn schedule their work.

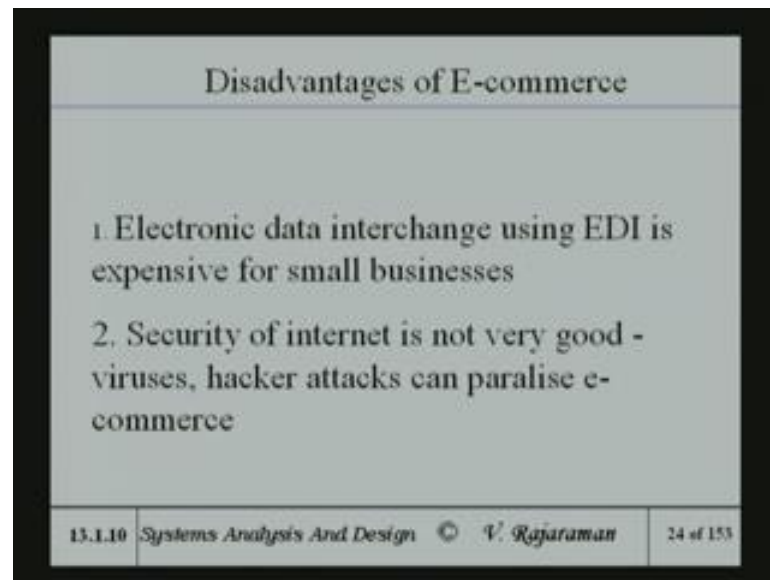
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And purchaser can vendor from can order from several vendors and monitors supplies. In other words, if I want to put all your eggs in a one basket. In a sense that, suppose you want to buy tires, you may not buy all your tire from one company. Because, the suppose if something happens to that company, either it goes on strike or may be that role it is blocked. Because of rains or whatever it is.

Then, you may really have three or four possible tire suppliers. And you can appropriately change the order from one supplier to the other. So, you can have several vendors and dynamically alter your requirements and so on. And based on the capability, as well as the quality and the promptness and so on of different vendors.

And production schedule and inventory of an organization can be inspected by cooperating suppliers, who can in turn schedule their work this is what I said already. So, these are all the advantages.

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There are also disadvantages, I mean nothing in the world comes with all advantages only, there always some disadvantages. And electronic data interchange using the standard EDI is expensive for small businesses. Because, there is a very complex set of documents, which can be defined for the electronic data interchange. And of course, that is undergoing a little bit of change to enable, the smaller businesses to get in through using the XML.

We talked about XML in an earlier module. And XML along with the document definition language. Allows you to kind of ((Refer Time: 38:47)) along with the XML and XML is a reasonable substitute for a standard EDI. And people are trying to go towards that kind of a method. But, where again the same problem arises each person uses own XML format. That is going to some difficulty, in terms of processing.

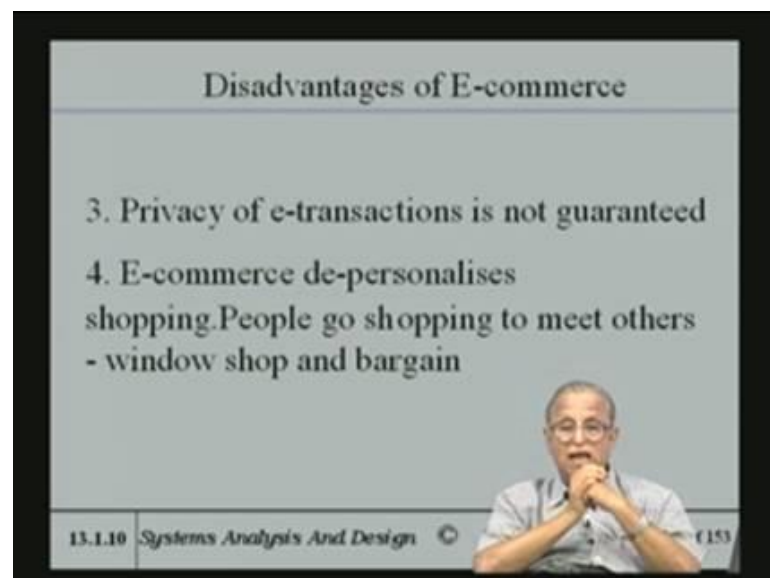
But of course, this is not as bad as one, where you end up with entirely different formats. And not knowing what format is being used and so on. But, still the point is it is standard formats defined by standardized organizations are somewhat complex. Security is always a problem in electronic commerce. And of course, people are come up with a lot of security methods, I will talk about later on.

But, still there is always a fear of viruses. The age good virus is taking software, new viruses come and every other day being, you see in newspapers a new virus, which comes and kind of wipes out your data or essentially creates a lot of nuisance for you.

And hackers who kind of attack your system, in other words they get into your system, breaking all security and steal data or corrupt data and things like that.

And also we talked about the denial of service attacks, where if you really want to deny a particular company access to their website. Then, they can flood that website or all kinds of ((Refer Time: 40:43)) queries. So, that legitimate buyers cannot access that website. Because, it is always engaged and it is like keeping your phone engaged by useless calls. And they can all parallelize your E-commerce. So, these are all real threads for us to be concerned about.

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Privacy in e-transaction is not guaranteed. In other words again, because it is a public switch telephone network, somebody can kind of get into the network. And steal data which is not in a is never been business to get. But, they will try to get it. The privacy is not guaranteed, particularly in personnel information, as well as the issues of exchanging data about, you know the what you want to sell, what you want to buy and stuff like that.

Is suppose you are advertising lot of jewellery on the net. And it is a open invitation for thieves to come and do something, unless you keep your jewellery carefully. So, in other words the privacy is not ensured. Ecommerce de-personalizes shopping, in other words shopping see electronically is nice. But, you do not really can touch and feel, in other words suppose you want to buy some textile items.

Say silk saree, ladies go there kind of look at all the silk sarees, feel that and see how it looks and so on. And that kind of a feel touching and feeling. And handling is not easy and also bargain hunting and window shopping. And people go to shopping malls, not just to buy items. But, it is sometime we meet friends ((Refer Time: 42:38)). And you actually spend a little time, in they some people enjoy shopping.

That kind of a what I would say personnel shopping is now available in E-commerce, depersonalizes. And makes it completely it insulates you from the rest of the population you might say, you do not meet anybody, you only meet electronically the shop. So, but buy an large there are certain places, where the de-personalization is not relevant. Like, if you are buying a train ticket, there is no question of touching and feeling.

Similarly, airline ticket and so on or even books. Books of course, you would like to browse by many of the book sites allow you browsing, gives you extracts and stuff like that. So, it is, but by and large there are certain things which are amenable to E-commerce, particularly b to e c commerce. And certain items which are not amenable to that. I think typically saree may not be amenable to b to c. Whereas, a train ticket is definitely amenable to b to c.

And now we will get into the actual technical issues about E commerce. And then, you discuss any area in computer science, what you try to do is to look at different aspects. Or see when you saw talk about architecture, you say that architecture of like I have been talking about a building architecture, consists about the ease of use. The various items which is go into making it. And there are number of things, like bricks and motor and the kind of paint and then the actual design and so on.

So, there are different types of things which has to be done by an architect. And so, you have to look at some an approach of discussing of the architecture, in different layers. The layering will be in such way, that each layer can be designed independently. And each layer is self contained, there is a interaction between layers. But, minimal interaction.

So, the layers are picked in that such a way, that each layer can be discussed and concerns about that explained, somewhat independently of the other layers. And normally, you look at multiple layers starting from bottom layer to the top layer. And the

bottom layer is the minimum infrastructure. And the higher layers, each layer uses all the services provided by the bottom layers.

It is like the bottom layer is a foundation. And then, all the others are built one over the other. Till the last top most layer, which may be in this case, in the case of house it is a person who is going to live in the house. And his convenience and so on. In the case of E-commerce the applications of the top most. So, I am not look at E-commerce architecture as a layered architecture, with many different layers. Each layer is being self contained and each layer will discuss separately.

And of course, we will talk about the interaction between layers. So, the bottom most layer is the physical layer.

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E-commerce System Architectures	
LOGICAL LAYERS	SERVICES IN LAYER
Application layer	B2B,B2C,C2C
Middleman services	Hosting services,value added nets payment services,Certificates
Secure messaging	Encryption,EDI,Firewalls
World wide web services	HTTP,HTML,XML,OLE Software agents
Logical network	Intranet,internet,extranet
Physical network	PSTN,LAN,Bridges,routers
<i>Layered architecture</i>	
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That is the LAN, public switch telephone network, bridges, routers and so on. And of course, these are not really concerns of E-commerce. See, you have a courses on computer networks, computer architecture and so on, which will talk about this the LANs and the WANs. And the routers, bridges all those things networks interface units and what not.

So, we are not going to talk about it. But, we expect we assume that there exist a physical network on which you are got to build. Because, already the physical network exists, you cannot be anything further. So, that is the bottom most layer, which is the most important

layer, which enables all the other things to happen. So, it is partly the physical layer is only the you might say, in this case of LAN's bridges and so on.

They are the Ethernet, the copper wires the, you know the connectors, the public switch telephone networks, which consists of again fiber optic cables may be sometimes even wireless and so on. So, these are electronic boxes and lines and stuff like that. And this physical network is over that becomes a logical network. That is if you use a TCP/IP protocol on a LAN.

Then, it becomes a intranet, in that multiple LANs are interconnected, it becomes an internet. If LANs of businesses or cooperating businesses are interconnected it becomes an extranet. But, all of them use the so called TCP/ IP protocol. So, they are all uniform using of a uniform standard. And that is why it is called a logical network, the physical network is a base on which the logical network is formed.

And we concerned about the logical network, in other words we are not actually even the design of logical network is not our concern. And that is again talked about in a computer networks course of what is a TCP/IP protocol? What is Ethernet and things like that. And all the internet facilities of course, to the extent necessary, we are talked about the internet in the earlier module.

So, that you understand what the entire internet means. Over the internet, there is a worldwide web, which is again an application. And that is got it is own set services, like hyper text transfer protocol. And we talked about HTML Hyper Text Markup Language, XML Extended Markup Language, object linking and stuff like that. And software agents which are essentially small AI programs.

So, they are all services available on the worldwide web. And over that, see once you have a worldwide web and communication enabled. And there are standards of communication, say worldwide web essentially, you have browsers, search engines all those things. Essentially, all in the worldwide web and the worldwide web's are I have put all of them see. But, you know that when you go to the web, you can use a you need to have a browser, you need to have a search engine and so on.

So, all of them really are part of the worldwide web services. And as I said, there is always the security concerned, about the transactions on the web. Because, the

transaction in the web takes place normally on the internet, internet is accessible to everybody. So, there is a layer called secure messaging encryption. So, called firewalls to prevent hackers to come in.

And sometimes to also various protection, software to protect your virus, protect you to from viruses. So, there is a virus protection, firewalls, encryption and electronic data interchange formats, which effectively provide you, you might. In fact, EDI could also a something which is, because these are all sent as messages. I put them in the messaging layer.

Because, you need to be able to encrypt the EDI also, before you send it to protecting your privacy and what not. And some of the EDI may be money transactions. So, that also again requires protection. Then, middle man services, the middle man services for instance there is which users, all these things and which enables say the commerce.

Like for instance the middle man in the eBay as the middle man service to enable customer two customer E-commerce. There are hosting services, suppose the company does not want to have website maintained in their concern. They may have a server maintain by the 24 by 7 the hosting service, which host your web site. And which also has facilities to kind of protect, your web site from denial of service attacks and stuff like that.

And value added networks, there is something were essentially provides you some privacy. And also provides you EDI and stuff like that. Payment services, that is how do you pay a cheques? How do you pay a cash? How do you, there is something called a PayPal which people use, which effectively allows payment, it is again a software which works on the internet. Or in fact, as a middle man service which uses the security and what not.

And digital signatures, you know when you make an order send a purchase order, you have to sign it. Normally physical purchase order, you have physical signature. Equivalently in electronic order, you must have a electronic signature. So, signatures and somebody has to certify, that you are a legal your signature is legal. That is really by a particular person. In that your web presence is also not a fictitious web presence.

Because, on the web nobody kind of sees you, you may not have in fact, legal presence and still may have web address. So, somebody who certifies that you are a legal entity. And that you can be kind of held to you know can be held responsible, in a court of law and so on is require. So, that is where they called something called certification.

So, certification organization is there to certify your presence on the web. And also certify things like your later on we will see, there is something called your public. You know for you got a public codes and private codes and so on. So, there are encryption codes. So, these things are got be also certified, so that is the middle man services.

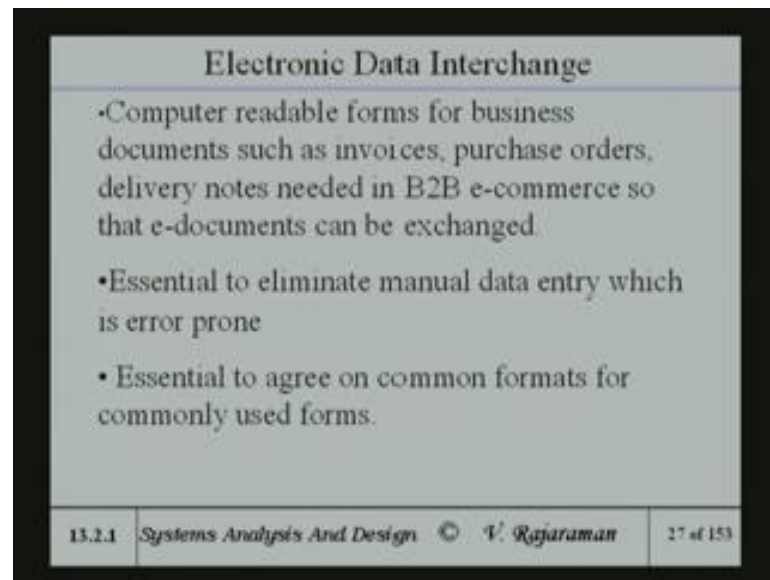
And of course, over that is the application layer, we talked about the b 2 b, b 2 b, b 2 c, c 2 c and many more application layers are growing like c 2 g, g 2 g and what not, with governments suppose you want to transact business. So, there are the application layer we talked about some details. But of course, you have to come back to application layer.

So, what will do now in the rest of the lectures is to kind of effectively look at each of these layers, I do not won not worry about the bottom two layers. And in fact, third layer also I talked about already. Third layer about XML and OLE and you know I am not really talked about OLE. But, HTTP, HTML and so on I talked about. And also I talked about search engines in earlier part.

But, any how it is not part of this real course. In fact, there are whole courses on internet technologies and so on, where you will have great length, you will talk about logical networks, worldwide web and worldwide web services and so on. So, as in my concentration will be on secure messaging. Because, security is very important as I pointed out. And on middle man services.

And of course, the top most layer which I talked about already. So, we will concentrate on the top three layers, in the rest of this. Because, they are very peculiar to E-commerce, the others are effectively used for all other purposes also other than E-commerce. So, the anyhow they are covered in many other courses in the curriculum.

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The slide is titled "Electronic Data Interchange" and contains three bullet points. The footer includes the text "13.2.1 Systems Analysis And Design © V. Rajaraman 27 of 153".

Electronic Data Interchange		
•	Computer readable forms for business documents such as invoices, purchase orders, delivery notes needed in B2B e-commerce so that e-documents can be exchanged.	
•	Essential to eliminate manual data entry which is error prone	
•	Essential to agree on common formats for commonly used forms.	
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Now, we start with electronic data interchange. Because, there is one of the things which essentially is part of the secure messaging layer. So, electronic data interchange is concerned with computer readable forms for business documents, such as invoices, purchase orders, delivery notes, needed in B2B E-commerce. So, that e-documents can be exchanged as said in c 2 c and c to b it is not that all important.

Because, the in the case of b to c the business provides you the form in which you fill it up, you do not have a freedom. Similarly, in c to c the middle man will give you some format to fill up. You do not have any freedom. Whereas, B2B both the Bs are freedom. So, you kind of have most of some common understanding or common standard. Essentially to eliminate manual data entry, which is always error prone agree on common formats.

(Refer Slide Time: 56:52)

The slide is titled "Electronic Data Interchange". It contains three bullet points: "•Electronic data interchange (EDI) standard gives specifications for commonly used standard business forms", "•Currently two standards are available for EDI forms", and "• It is possible to adapt these standards for documents which use XML for specification." The footer of the slide reads "13.2.1 Systems Analysis And Design © V. Rajaraman 28 of 153".

Electronic Data Interchange			
•Electronic data interchange (EDI) standard gives specifications for commonly used standard business forms			
•Currently two standards are available for EDI forms			
• It is possible to adapt these standards for documents which use XML for specification.			
13.2.1	Systems Analysis And Design	© V. Rajaraman	28 of 153

This EDI standards gives specification that commonly used standard business forms. The EDI standards are come in fact, even back in 1970s or even early late 60s, early 70s. The big businesses it is all a transacting business, in that those days internet was not there. But, still businesses was transacted electronically, in the sense that the purchase order will be send by a tape in where the big purchaser.

And so the electronic data interchange took place, through tapes and physically the tapes are being exchanged and so on. So, the formats it is all be standardized point early in the history of computers. And there are two standard, which are available which have been standardized by international agreements. I will talk a little bit about, what these two standards are, without go into great details about a standards.

Because, that itself is a huge chapter and I am I do not have time to do or really be justice to all of it. So, I am only look at the some aspects of it, it is possible to adopt these standards to a documents, which are in XML form. So, that XML is said is somewhat easier to use so by organizations.

(Refer Slide Time: 58:27)

The slide is titled "EDI Standards" and contains a bulleted list of two standards. The first bullet point mentions the ANSI X.12 standard proposed by the American National Standards Institute. The second bullet point mentions the EDIFACT (Electronic Data Interchange For Administration Commerce and Trade) standardized by the United Nations Economic Commission for Europe for international trade. A third bullet point states that EDIFACT is used in India for government transactions, specifically for customs and central excise. The slide footer includes the text "13.2.2 Systems Analysis And Design © V. Rajaraman" and "29 of 153".

EDI Standards	
•ANSI X.12 standard proposed by American National Standards Institute	
•EDIFACT (Electronic Data Interchange For Administration Commerce and Trade) standardized by United Nations Economic Commission for Europe for international trade	
•EDIFACT used in India for government transactions - customs, central excise etc.	

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And there are two standards, one is called the ANSI X point 12 standard, standard is by American National Standards Institute. And something called EDIFACT Electronic Data Interchange For Administration Commerce and Trade, standardize by united nations commission for Europe for international trade.

The first one is used by Americans, second one is used by Europeans. And we also use a European standard, EDIFACT is used for government transactions. Particularly customs department and so on uses this.

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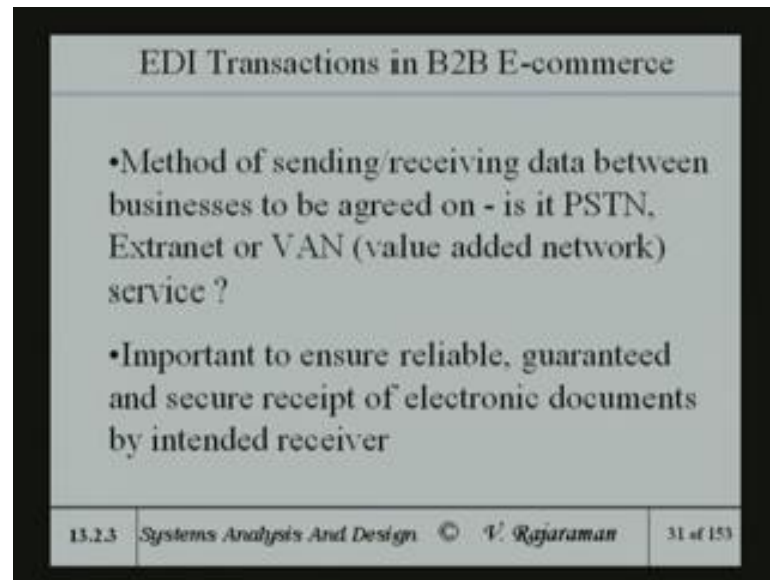
The slide is titled "EDI Transactions in B2B E-commerce" and contains a bulleted list of two requirements. The first bullet point states that cooperating businesses must agree on an EDI standard. The second bullet point states that programs are needed to translate data received in EDI format to a form needed by the application program. The slide footer includes the text "13.2.3 Systems Analysis And Design © V. Rajaraman" and "30 of 153".

EDI Transactions in B2B E-commerce	
•Cooperating businesses agree on EDI standard	
•Programs needed to translate data received in EDI format to a form needed by the application program	

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Cooperating businesses will agree on EDI standard. And programs are needed to translate, the data received in EDI format to a form needed by the application program. That is effectively what one has to do.

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The slide is titled "EDI Transactions in B2B E-commerce". It contains two bullet points: "•Method of sending/receiving data between businesses to be agreed on - is it PSTN, Extranet or VAN (value added network) service ?" and "•Important to ensure reliable, guaranteed and secure receipt of electronic documents by intended receiver". The footer contains the text "13.2.3 Systems Analysis And Design © V. Rajaraman 31 of 153".

EDI Transactions in B2B E-commerce		
<ul style="list-style-type: none">•Method of sending/receiving data between businesses to be agreed on - is it PSTN, Extranet or VAN (value added network) service ?•Important to ensure reliable, guaranteed and secure receipt of electronic documents by intended receiver		
13.2.3	Systems Analysis And Design © V. Rajaraman	31 of 153

And we will talk about the transactions in B2B E-commerce by what are the EDI transactions next time. And we talk about the VAN, some extent we will talk about VPN in the next lecture. So, I will start at this point, the next lecture and get into some aspects of EDI transactions in B2B E-commerce. So, I will stop here and continue next time.