Systems Analysis and Design
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Lecture – 32

Last time, we were talking about security and other aspects of information systems. And I am very quickly revise, last transparency, which we had on the on the system. Now, we talking about primarily requirement for recovering from disasters. Now, one way of recovering from disasters, I said was to have a backup. That is, backup everyday incremental. That is, whatever change that day and backup every week.

And so, in a given day is there any failure, you can go up to the previous day and take, whatever happened in the particular day and get back to, where you where. These alright, if you can afford to have, say a few hours of disruption service. But, there are certain situations, where you cannot afford to have any disruption at all. Let me take an example, many of the airline reservation systems and railway reservation systems and so on.

Work 24 hours a day, 7 days a week and they cannot really tolerate, any kind of a disruption in service. Because, disruption particularly in airlines reservation systems could mean, that they lose a lot of customers. Because, there are many competing airlines, if one airline system does not work, the customer will automatically go to another airlines. And maybe, book there, so you have lost an opportunity.

And there are certain banking transactions, which are always online. Particularly, if you are transferring large amounts of money from one bank branch to another bank branch, this is currently also available in India. For since, state bank of India has something called, anywhere banking. So, they have a unified numbering systems for all accounts in all banks, almost all banks, excluding, some of the rural banks.

That is, all the metros and also including place, like Bangalore, Hyderabad, Trivandrum and cochin and so on. All the computerized branches, they have, many of them have been identified, fairly large number, have been identified as anywhere banking. That

means, you can encash your cheque, giving the cheque in any branch of state bank of India, anywhere, else in India, going to a branch, which has got, anywhere banking.

Similarly, they have also, if you want to transfer a certain amount of money to another account of a friend in living in a different city. You just have to go to the bank and give the account number of that, friend and give details about the transactions, you made. And this branch, when it enters that transaction in their computer. And automatically, it will update the accounts of your friend in a bank, elsewhere.

In other words, it is almost at a touch of a button, money is being transferred. While, money is being transferred and so on. You have to be careful, that if there is a break down somewhere and there is a possibility of duplicate transfer or mistransfer. So, these things require, particularly some kind of a mirroring. In other words, the same transactions are carried out in another site, which is called a mirror site.

That is every transaction, which is carried out in a major bank or major airlines reservation system is duplicated in another centralized system, elsewhere. So, that, even if there is a disaster in one place. Then, the mirrored system will automatically take over. In other words, every transaction having been mirrored, that means, repeated, elsewhere. There is no disruption at all in service.

Because, it smoothly transfer from one computer, which may have failed or may have been affected by a disaster. Like, say a flooding system and so on and take it over to the another place. In fact, some of the banks for instance, who have such systems. You know, they may have one site in Mumbai and another mirror mirroring site in a place, which is maybe even far away, it could be even in Chennai.

Because, communication speeds are now fairly high and communication speeds are going up, every 9 months, it is doubling. So, where is a does not really matter, where the actual computer is situated. Because, the speed at which data travels, over fiber optic lines is at the speed of light. And so, there is no real time lack between any transactions happening, in any given branch. And that, transaction being mirrored in a, so called mirror site, elsewhere.

So, this is what is done in highly in a while, say a system, which should not ever be interrupted. In such a system, these mirroring is always done. So, mirroring is an

expensive affair, because you have to have a duplicate system. You have to run that, also 24 hours a day and you have to keep it up to data and any transactions being duplicate. That means, double the cost plus the communication cost and plus the man power cost and so on.

So, you do not do it likely, you do it only for situations, where you just cannot tolerate any disruption at all. Only in such cases, such mirroring of transactions are done. But, you have to be, you have to ask your customer, if you are actually developing a system for a customer, you have to ask a customer, how critical is it. Can your business survive, if there is a, say, few hours delay, can your system survive, if say, how long can it survive.

Suppose, were disrupted for few days, many business cannot survive at all. If it some business survive, if they disrupted for a few hours or even a day. But, some others just cannot afford to have any disruption what so ever. So, that is where you go the mirroring. Otherwise, you can do a backup and use a backup and return back to the system with a back up copy and restore it, because restoring with the backup may take a few hours. Apart from that, there are many places, where there is a physical security, physical loss.

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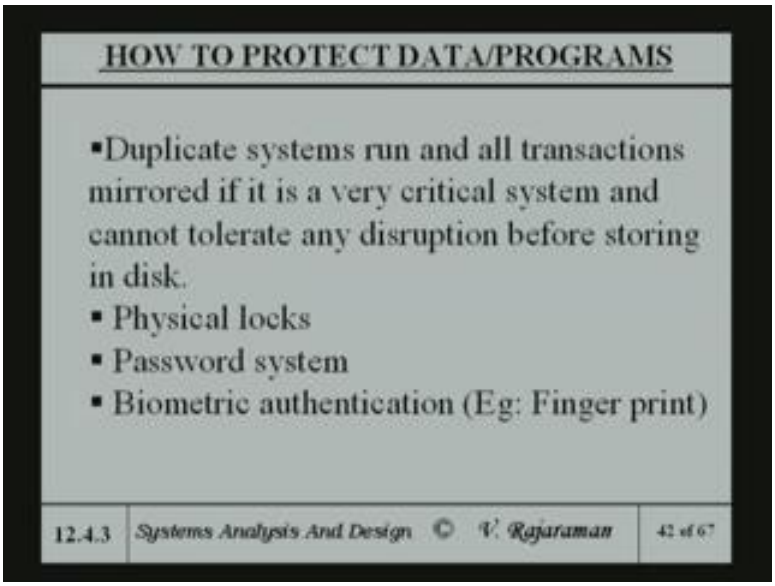

In other words, the locks are actually not electronic locks, but physical locks with a key and so on. And they also have a surveillance system. That means, the video camera, which captures every person, who enters that particular secure area and does any kind a

transaction on a computer. So, physical locks along with a system to record, whoever entered and so on is put.

But, since in Bangalore, there is a big data center, which is run by reliance communications. And they let out; areas in that data center, for banks should put their machines. Because, they guarantee 24 by 7, service is uninterrupted, power supply, air conditioning security and so on. It is called a centralized data centered, where, you know you hire out space to various organizations.

Primarily, banks like to have this, because banks cannot afford to have a complete set up in their own premises. Because, of various reasons including the reasons of security about power supply and things of that type. So, they provide, you might say kg's or say cubical for many banks to put their machines. Obviously, banks do not want somebody else to enter their computer area and do anything with that machine.

So, they have physical lab and electronic surveillance system. That is a little camera are highly looking at the, anybody who enters and when somebody enters the time at which he entered and what he did internally, they all logged. So, once, you pass a physical lock, you have a password system. That is electronic lock for getting into the machine. That is on the terminal, you have to have password and also biometric authentication.

Other words, I said finger print for instance finger print recognition is there. So, you put your finger print on little scanner, that reads that and then, check that, against authorized finger prints. And allows you in provide your finger print matches. So, that way, they can have an audit trail. They can trace, who changed some data at what time and they can prove with a quote of law, because there is a picture. That is, all diametric authentication.

So, these are precautions, you always really take. In fact, nowadays biometrics have gone much further. They even have something called eye rays recognition systems. That is, when you lo at your eyes, every persons eye has got a very special set of red lines emanating from the pupil. And so, these set of lines are distinct. And so, you do not have to really, even put your thumb. You just sit in front of the machine, there is a camera, which look at your eyes and says, whether you are authenticated or not authenticated.

So, biometrics systems are also continuously advance, because some people do not like to put there thumb impression. But, the point really, I am trying to make is that, when

you run such common facilities, like a data center. You have to really take care of the issues of security with all possible methods, including physical lock, electronic lock or password system and also biometric. So, that, you say, as is said prevention is better than cure.

So, this will essentially put a certain kind of fear in a person, before he does anything. Because, he knows, he is being watched. And whatever, he is being done, whatever he is being, particularly with a critical database is being trailed and a record is being kept. So, an audit trail is there.

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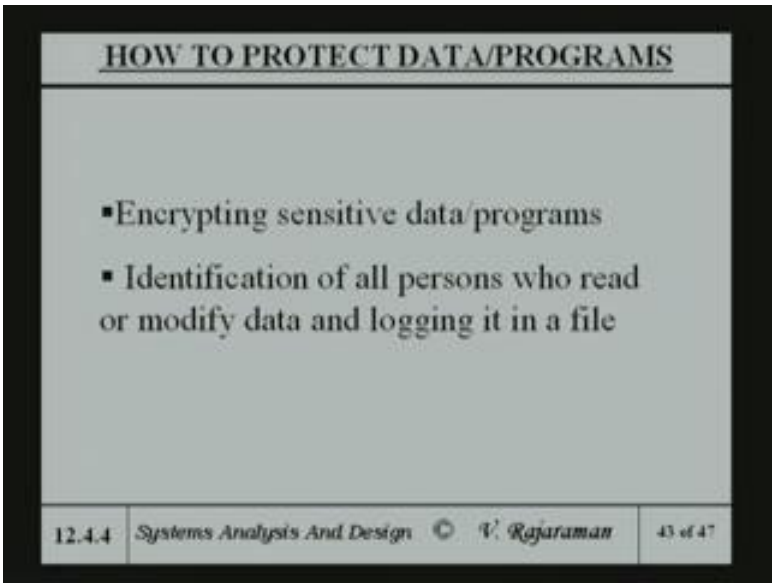

Now, apart from that, encryption of sensitive data, particularly things like credit card numbers and lots of other critical data are normally encrypted and stored. So, even, if somebody, a particularly hacker or somebody gets hold of it, he will not be able to interpret. Because, of the fact, that is encrypted, unless, you have the key for the encryption, you cannot decrypt it. So, again, identifying all persons, who read and modify data.

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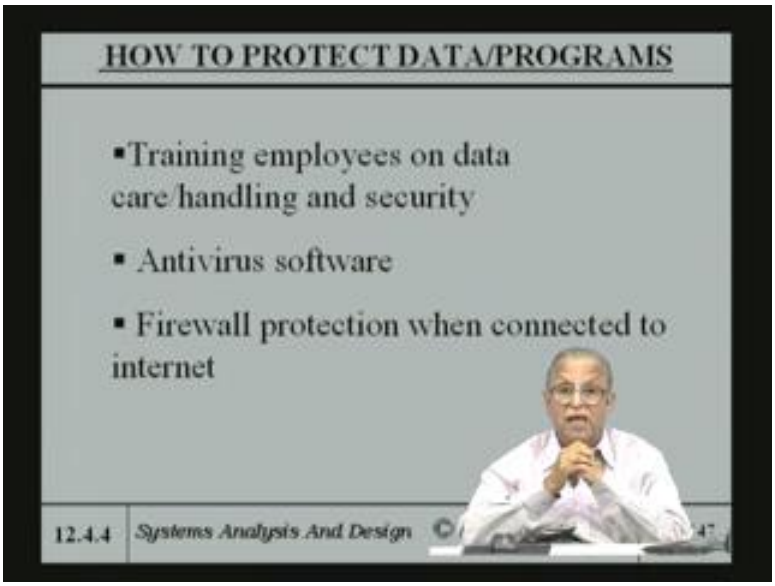

And you have to, while keeping all these prevention measures; you also have to train employees on data care handling and security. In other words, do not allow your employees to carelessly reveal some data, such as password and things of that type. And also, the employees, when they enter such secure areas and particularly, deal with things like credit card numbers and other critical data.

They are not allowed to take an, even a scrap of paper or even a mobile phone, because they can note down some numbers there, if it is unencrypted. And then, they can come out and use it or they are not allowed to take any floppy disk, out of the room or pen drives anything of that type. So, they actually searched in doing this. Of course, anyhow, the camera is there is always looking at you.

And so, the kind of frauds, which occurred in bank, where a new employee was able to get hold the credit card numbers. And of de fraud up to extent of half million dollars, just shows shear carelessness. On the part of the bank in having proper security measures in place, as a responsible systems designer, you should really make sure, that when critical data is there. They are encrypted or you do not allow any method of kind of taking that data out, without a supervisors consent.

I mean, in other words, even a supervisor cannot take the data out; the data has got to be in the machine. And that is got to be done with great amount of care. And also, I said that, if any machine, which is connected to the internet, virus is always a problem. So,

you always put antivirus software, but antivirus software is got to be continuously updated, because new viruses come all the time.

Unless, you have updated antivirus software, which is almost sometimes, you have to update almost every second day. It may turn out that, some new virus comes and attacks it. Of course, normally the antivirus software people try to catch, whether it is early. And then, they to kind of update their antivirus software and it is always available online on the internet.

So, you can download it and in fact, have a continuous check. And this also called a fire wall protection. To prevent unauthorized access to your computer of people, who do not have any authority? And also certain amount of certain methods, whereby, the presence of various types of computers in organization is not even is shielded by the firewall. I will talk about the firewall in slightly greater detail. When, we talk about electronic commerce in the next set of lectures.

So, I think, I will not get into great detail about firewall. But, there is effectively another computer, which make sure that, unauthorized people do not enter your local area network or your intranet. And do you have anything, which is legitimate there.

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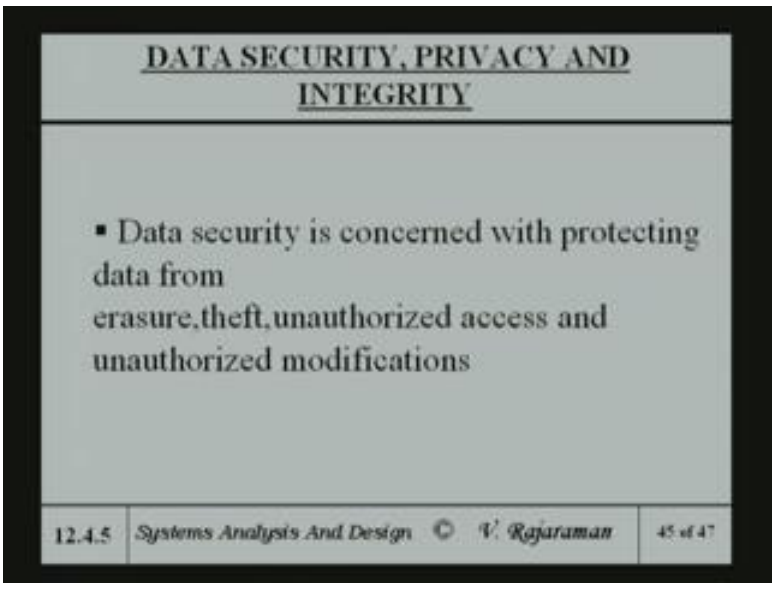

Data security as we said, there are three different terminologies, which is used in relation to the care of data. One is security, which we have been talking about. There are two

other issues, one is called privacy and the third is called integrity. Data security, data privacy and data integrity are related, but they are kind of independent. Security is necessary condition for privacy. But, it is not sufficient for privacy, will see what, see why?

Data can security is concerned with protecting data, from erasure theft, unauthorized access, unauthorized modification and so on. That is, what we have been talking about. And also of course, security is concerned with preventing disasters. And even, if disaster occur, try to kind of recover from disasters by various means.

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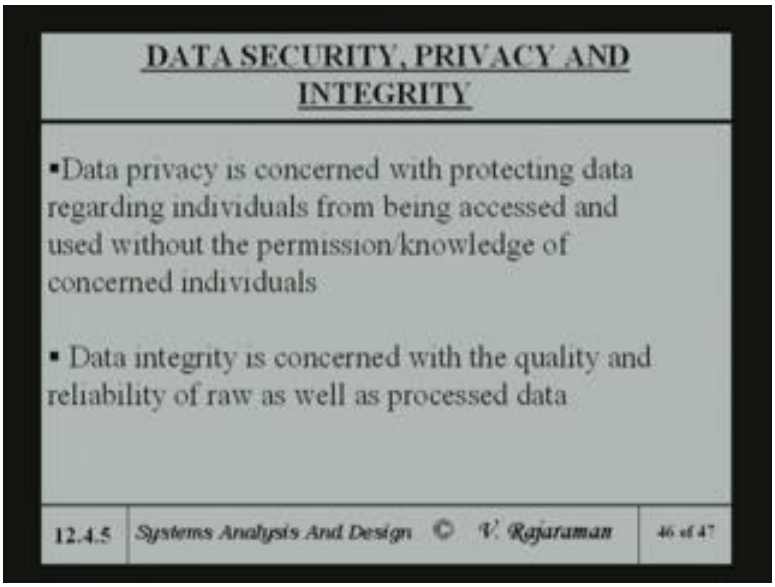

Privacy is concerned with protecting data, regarding individuals from being accessed and used without permission or knowledge of concerned individuals. Some others data, like credit card data, of course, is something which is financial implications. And that is got to be kept secure. Apart from that, of course, privacy is more important in certain areas, where you might not say, that it makes much of a difference, like for instance medical records of individuals.

Medical records of individuals is should be protected from others. In other words, it is a private matter, about once health and once, what kind of medicines the person is taking. It should not be common knowledge and so this is a privacy concerned. Privacy concerned is things like, your medical information, your bank balances and your

financial transactions. All these are had to be kept private to you and not reveal to any anybody and everybody.

This privacy is something which is conceptually, you know, it is somewhat different from security. In the sense that, this separate loss are actually implemented in many countries to protect the privacy. Because, the privacy is lost. Essentially, you are somebody's kind of peeping in to your life and that is something which is not allowed and privacy is highly valued. Particularly, in the western cultures and they are very, very worry about, others knowing about their private affairs.

And so, the issues are in terms of, in fact, enacting lose many countries have enacted privacy loss to make sure, that companies do not reveal information about you, without your knowledge. Take a simple example, when you subscribe to a magazine. You give your name and your address. And sometimes, they ask for your phone number, you give all that. And when you give that, if they use that the information to sell that information say for instance.

To others, for instance, for sending adds to your house by mail or phoning your all at times. Saying that, open an account with or bank or start this insurance and things of that type; that means, your privacy has been lost. And that is been lost, because, somebody who has a data about you is selling that data, without your consent. So, very often, nowadays they have a little column, which says, do you have any objection to revealing your data to other people. Whomever, interested in sending you some valuable information.

And very often, you tick no, because if you tick yes, you are essentially opening yourself to the flood of un call for junk mail, whole lot of junk mail will come. That is useless mail will come, which will waste your time. Just like, whole lot of junk or spam will come on email. If you reveal your email address and all types of useless crops will come to your email address.

So, it is very important. The privacy lost there. Then, that is a compulsion on the part of the company not to reveal. You are the information, such a telephone number, email id, your actual postal addresses and stuff like that. So, privacy is concerned with that. Integrity is concerned with the quality and reliability of raw as well as processed data. So, integrity is at higher level.

In other words, security something where you let me take a very simple example. See, if you have very good lock and lock up lot of material, inside a box. You can say that the material is secure. But, the material inside the box is useless from the point of; that means, it is literally related or something like that. And it cannot really be used. There is no integrity in that. In other words, the quality of that material, even if provides a, you know of kind of break the lock and get it is not much use.

So, the integrity is concerned with quality and reliability of whatever is a process information. So, security is something else, does not imply privacy or integrity. Integrity is one level higher in terms of quality control reliability and so on. Privacy controls as I said requires loss, which is that to extreme people from revealing your personnel data. Ultimately, system security and integrity are very important.

So, this is essentially the end of this particular discussion about security, about audit and about, generally I talked about audit information systems, security information systems, trailing transactions and so on. These are important in terms of designing any information system. So, whenever, you design a system, you got to keep that in your mind, while designing.

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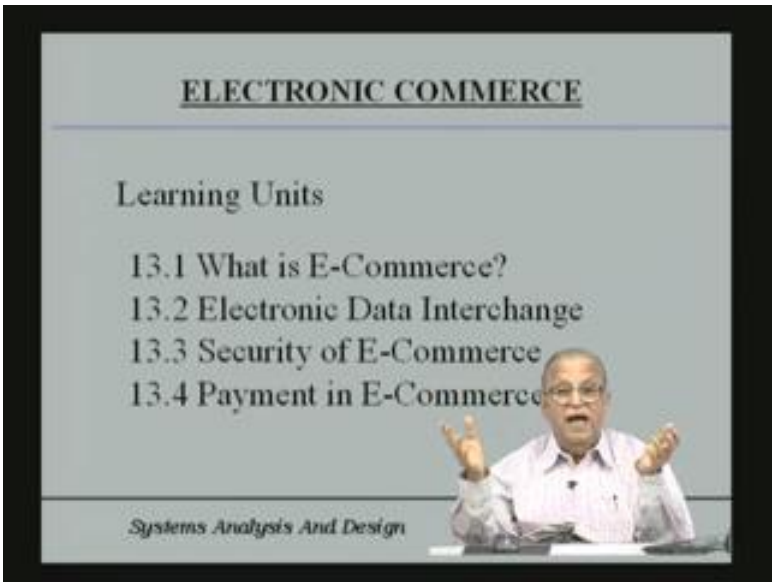

Now, we will go to another topic and the other topic is electronic commerce. And one might wonder, why would, I talk about electronic commerce in this course on systems analysis and design. The primary reason why, I have included electronic commerce in

this systems analysis and design course is because more and more of systems are now based on the internet and the world wide web.

The days of an isolated computer, where you design the system, implemented for a company are gone. Now, within a company, computer are connected. So, that is an intranet. Intranets are connected to other intranet, the extranets and there is an internet. Already, we talked about in these the earlier module. But, the point is that, because of the fact that, electronic communications is become so fast and in expensive. And computers are all connected together on the network.

Nowadays, information systems cannot be designed for systems on isolation. You are design it for systems, which are essentially internet connected or internet enabled or intranet enabled. So, what is a reason, why, I am going to be talking about this topic? I will again come back to this question of, why we should learn about electronic commerce in great detail later on.

But, this module, will first define, what is E-Commerce and in E-Commerce, they got to be able to interchange data between organizations. So, what is electronic data interchange. And particularly the internet, the issue of security becomes very, very important. Because, internet is something which is accessible to a lot of people, hackers even your home computers connected with the internet. So, anybody and everybody can get into the internet.

So, security takes on lot more importance and there is a question of payment. In fact, many of the E-Commerce application today require payment, like if you want to book a ticket for trains, you can book it from your home, using the internet. That is one of the E-Commerce applications. And you have to pay for the tickets, which you bought and how do you pay for it. These are issues and payment itself has got various different aspects.

Like there are, as you know, your cheque payments, your credit card payments, your cash payments. So, you have to be any, all the three cheque payments, credit card payments and cash payments, all three has to be somehow meet in the electronic commerce world. And I will give you a glimpse of this, because if I go into the details of every one of them, it will take a whole course.

In fact, in the curriculum normally electronic commerce is given as an elective course. Maybe in the 3rd or 4th year of your BE course or you are doing MCA, may be in the 2nd or 3rd year of your MCA course. So, this will only again give you, bird's eye view or overview of, what electronic commerce is all about.

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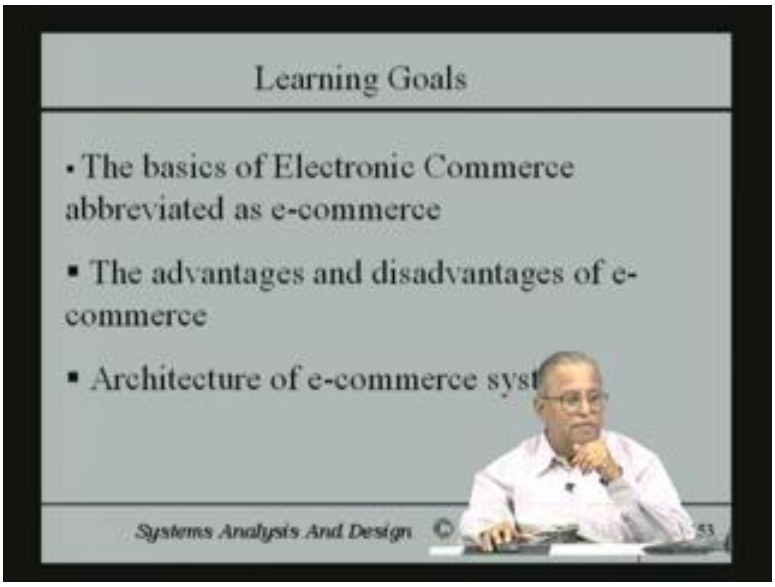

So, what we learnt is, what are the basics of Electronic Commerce? The advantages and disadvantages electronic commerce. What is the architecture of electronic commerce system? That means, how was the electronic commerce system organized and put together, as what I mean by architecture. Particularly, ease of use and things like that.

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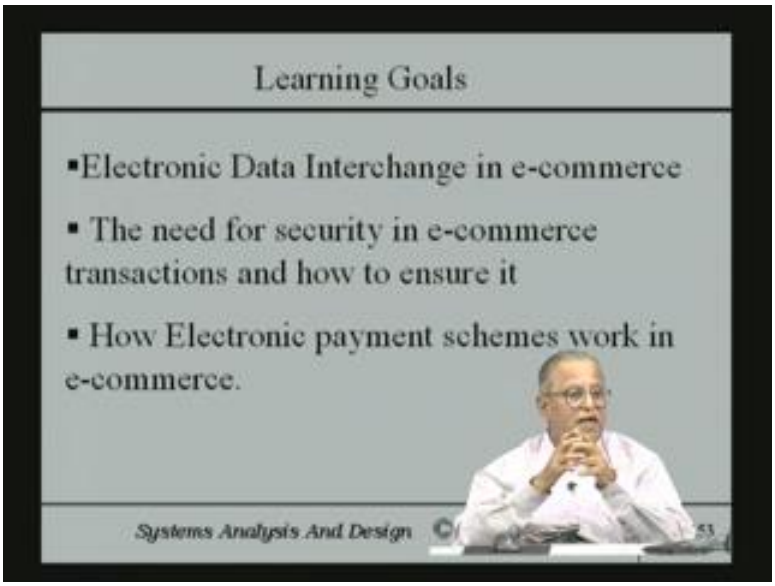

And electronic data interchange, the need for security and how electronic payment systems work. These are the points, which we are talked about.

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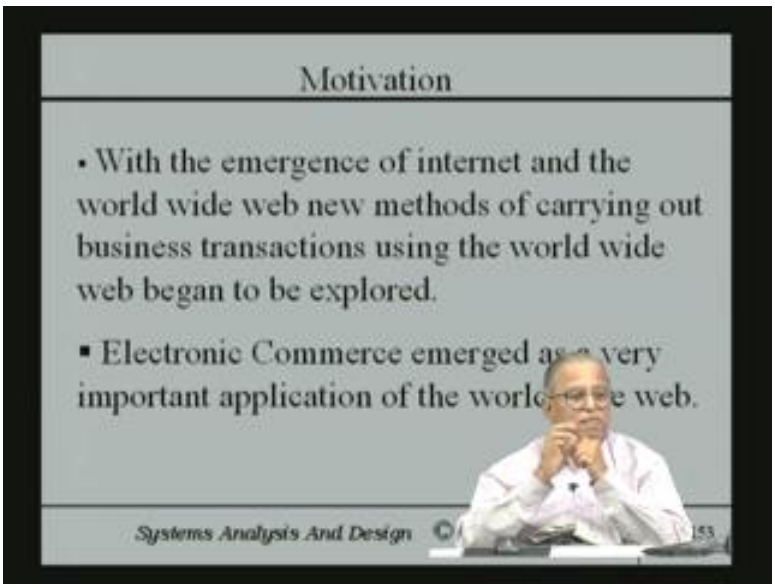

With the emergence of the internet and World Wide Web, new methods of carrying out business transactions, using the World Wide Web has had began to explored. As I said, nowadays no computer is in isolation and E-Commerce, Electronic Commerce; you know it is very important application of the World Wide Web. In fact, without World

Wide Web, E-Commerce cannot be there and E-Commerce is the very, very important part of the web.

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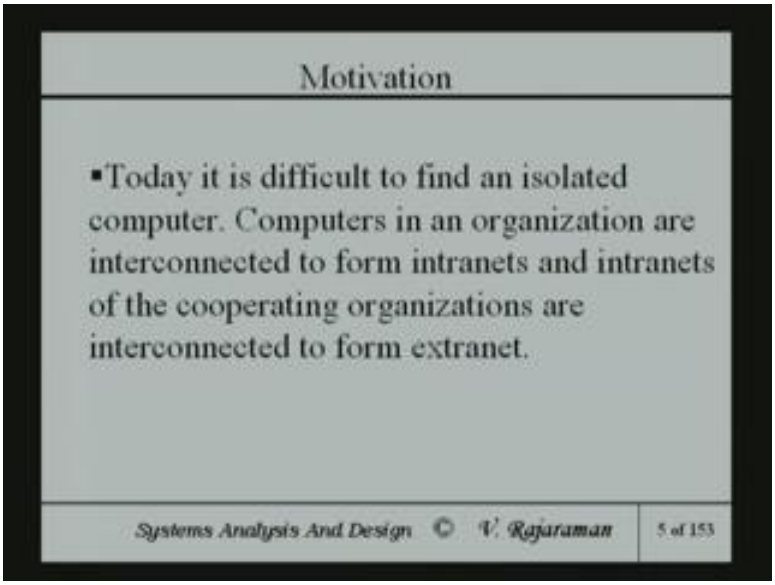

And today as I said, it is very difficult to find an isolated computer, computer are all connected. And intranet, internets are there an extranets between cooperating organizations.

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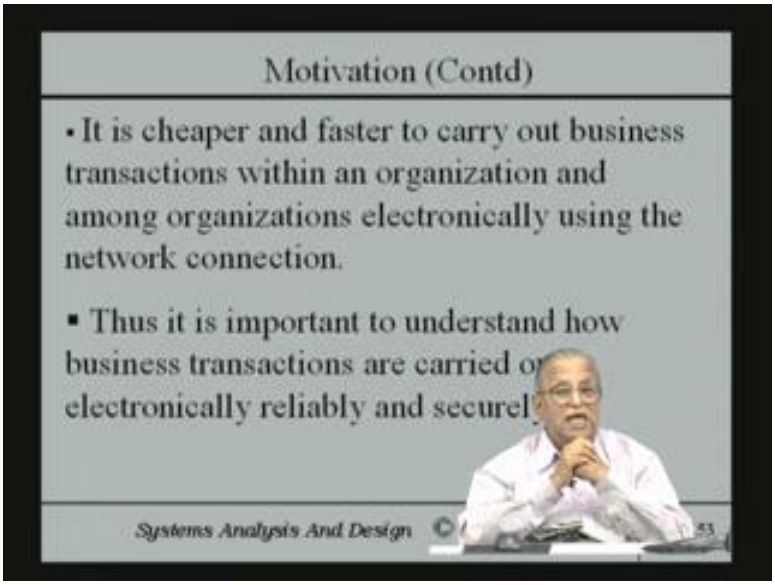

It is cheaper in carry, see this is very important. It is cheaper and faster to carry out business transactions within an organization and among organizations, electronically

using the network connections. Because, the electronic connection makes communication extremely fast. See, earlier on, we use to depend on the postal service, courier service and so on and written documents, which flow from place to place.

When, written documents is come, very often, they got to be reentered. And of course, there is a delay in transit in the post. For instance, there is lot of difference between, for instance email communication to America today is goes instantly. See, you send email within about couple of minutes, the recipient has it. whereas, you post a mail to him by postal system. Even, it may be air mail, it will take at least 8 to 10 days.

And if it is go through a very expensive courier, it may take at least 48 hours. Because, physically the plane has to go there and your document has to be delivered. So, electronic speeds are so fast, that also so cheap. Electronic mail is almost no cost compare to air aerogram, which costs you 15 rupees to mail or courier, which costs you 100's of rupees to mail.

So, the point really is electronic mailing system and commerce system is so fast and so cheap. That the cost of being business and the productivity of the business goes up, when you adopt this electronic means. And go away from the earlier, means, which dependent upon the postal system or the courier system and so on. So, that is important to understand how business transactions are carried out, electronically reliably and securely.

Because, these are two keywords, say because, when you go to electronic world, you had to be worry about security and also reliability. Because, reliability in any case is important for any system.

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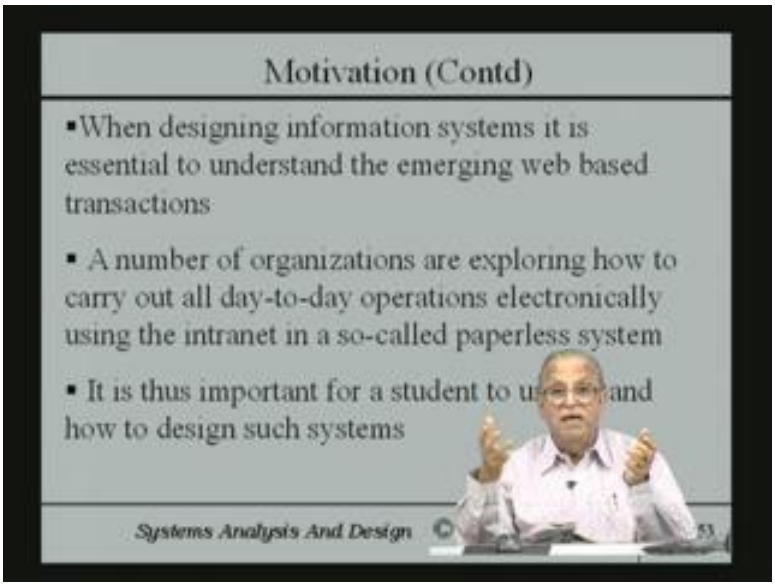

And when designing information system is essential to understand the emerging web based transactions. In other words transactions today between companies or on the internet and so, they are using the World Wide Web. And there also certain things, which emerging called web services. Certain services like, even for instance the word processor or a spreadsheet or an accounting package, maybe available as a web service.

So, you effectively go and use that service and as of now some of those services are free of cost. But, as times go by, those services will also be costed. And you may end up paying for that service at some cost depending up on, how much you used it. What facilities you used and so on. So, there is a certain kind of a difference, which is taking place or transformations, which is taking place the way business is being done.

Also, some transformations being taking place in the way in which computers are also being used. And so, there is a whole lot of new systems, were coming up, which are based on, so called web services. And many of the companies in India today, which do outsourcing work and so on. Effectively, use the web services model and for many of the applications, primarily because of fact that, once you get to the web and so on, distance does not matter.

The customer may be in America or South America or anywhere in the world, but electronically the distance is almost 0. Because, the information travels at the speed of light. So, business is going on as big hits, put it, puts at the speed of light, very fast. And

so, that is a reason, why one has to be aware of these things. And number of organizations are exploring, how to carry out all day to day operations, electronically using their intranet and so called paperless systems.

In other words, they do not want to have papers going from place to place to place, rather than that, everybody has on his table a desktop system or whether the person is traveling, he has a laptop system. And even, when they are traveling the laptop systems connected by Wi-Fi or wireless. A wireless high facility system to the internet and he can get to his particular company by using the World Wide Web.

So, the point is that, the machines being connected, allows you to kind of look at data and transmit data without any interference, without any paper transactions. And so, this is much so faster and cheaper. In fact, even governments now in so called, E-Governance initiatives, they are trying to kind of minimize the flow of files from one table to the next table and so on.

So, whatever files are there, they try to make a noting on the machine. And then, transmit that file to a database from which somebody else can access. So, there are many systems, which are emerging. Of course, in government, it is not yet come to some kind of maturity. Because, it takes a little bit of changes in the mind set, as well as changes in the many basic laws.

But, with an emergency so called right information act, which allows public to have the right to look at all government information. It will be more or less, all government office be forced in the near future to have electronically available. So, anybody can kind of go and look at, what reasons, particular all the transactions, which to place or all decision, which to place, in certain government offices are transferred. That is known to the public.

And once, this right information act comes in and then, people can have access to data. Hopefully, when they computerize everything, you can even have access to the data from your home, using the government website. Once, you have that, it is hope that, this transparency will put a certain amount of responsibility, in the responsibility for bureaucrats and others working in government to be more responsive.

And be more careful, about what they do. And one hopes that, this will in some sense, eliminate the delays, eliminate corruption and stuff like that. So, there is a definitely very, very good opportunity of providing better transparency. If we use an electronic methods, like E-Commerce, E-Governance is the other parallel thing. That is commerce which regarding businesses, governance is regarding government offices. Of course, we public has to deal with both companies and with the government.

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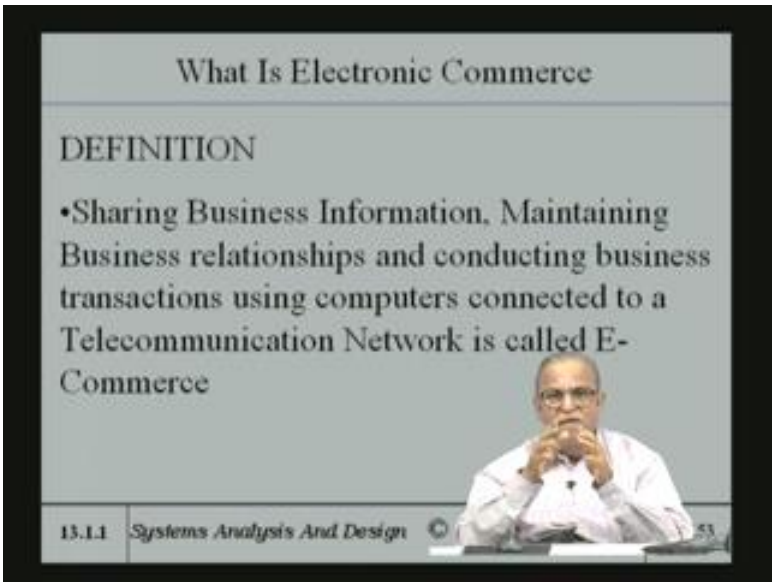

And then, for a student should really understand, particularly for deriving information systems, you should understand this, what it really means. So, that is the reason why, we are going to talk about electronic commerce at a certain length, I am going to devote a few lectures to this. And as I said, even though, it is not an entire coverage of the whole discipline in a very broad sense. It will essentially give you, very quick and good over view.

So, that, you can be aware of, where they fit in, into a real kind of information system, which you design. So, I will define electronic commerce as sharing business information, maintaining business relationships and conducting business transactions, using computers connected to a telecommunication network. That is called e commerce. The key terms here are, you know the sharing business information. That is certain kinds of, for instance, one business information, which is shared.

If you got, say, your price list, what goods you available at what price and so on. This information would can be accessed by anybody to find out, if you want to kind of buying the item from you. If we competing businesses have this kind of information on their website, it will be easy for customers to decide, where to go. Similarly, very often electronic companies, like companies which sell integrated circuit and so on. Put all that data sheets on the web.

So, you can get hold of, if you are designing anything, you can go and look at the data sheet and use that for your design. So, that is business information, you kind of look at business information is relevant. Maintaining business relationships, what is meant by that is, the two businesses want to transact business between one another, one may be a vendor, one may be a purchaser. So, the vendor and purchaser want to interact. So, the interaction is enabled by the electronic commerce system.

So, maintaining such relationship between, say vendor and customer, conducting business transaction. That is, the transaction in this case is that the purchaser, sends a purchase order and the purchase order goes to the vendor. So, the transaction is a purchase order and that goes electronically to the vendor. And now, electronically, the vendor sends an acceptance, if he accepts that order and also, give some information regarding delivery time and stuff like that, cost delivery time and so on.

And the purchaser acknowledges, saying that, I have received it and now, I confirmed the order. Then, the person goes ahead and sends an item to you physically. But, along with it he will send electronic chellan, he might say, by internet. Saying that, I have sent it on this particular day and these all the, there is a kind of a data, which it contains. So, transactions are again carried out with this.

And computers are primarily used in both cases. Both the vendor and the purchaser use computers. Both of them are connected to a telecommunication network and this telecommunication network is of course, the necessary network to interconnect machines. And normally internet as I pointed out, particularly there are two different companies, situated far apart. Telecommunication network can be a private telecommunication network or it can be a public telecommunication network.

Private network means, you put your own leased line. So, that this leased line is not available to anybody to kind of intrude or you may decide to use the public switch

telephone network, provided by the telecom provider, like in India, Bsnl or Reliance or Tata and so on. This called E-Commerce.

That is sharing business information maintaining business relationships and conducting business transactions using computers connected to telecommunication network is called E-Commerce. So, this kind of encompasses all the points, which are actually related to E-Commerce.

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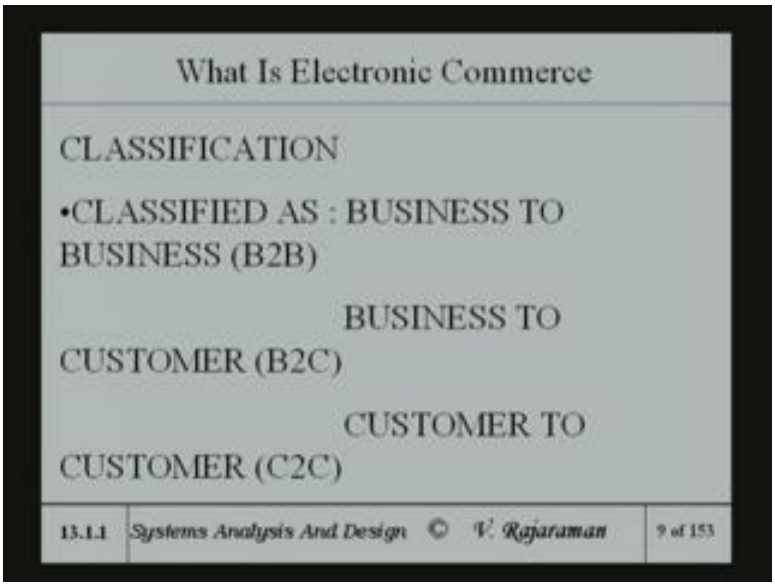

E-Commerce is normally classified into three types. One is called business to business E-Commerce. So, people abbreviated as B2B and as usual computer people kind to have acronyms. They use short hand and TO become 2 and one may like it or may not like it by the struck. B2B is effectively business to business and business to customer. Business to business means, 2 businesses are actually transacting some commerce or business between them, using the telecommunication network.

And business to customer means, there is a business and there is a customer. And the customer is actually transacting some business with the company, like you may be, it may be retailer. Retailer may kind of give you, a customer; he may sell retail items on the net, like I will give examples of this. And then, customer to customer, customer to customer is very interesting in the sense that, if there are two customers; that means, I am not a really retailer.

In the sense that, I do not sell things every day, I do not have a shop selling things. But, I have something to kind of sell, I have second hand radio, I want to sell a second hand radio or second hand furniture to somebody, whom I like to buy. So, another person, may be looking for a low cost radio, which is a second hand radio or even a second hand car or a second hand furniture.

And so, there is an other person, also sees this. And so, now the two customers had to get together and decide on the price and decide on, how to exchange the goods and money. These of course, any two random customers, may find very difficult, because I know where and which I could find out, who has furniture to sell and so on.

So, new companies are come up, which I have call the middle man companies, like the E-Bay and which essentially work as a go between or a broker between two customers. And they charge brokerage, you might say for both of them, from the buyer and the seller, which are both customers. So, customer to customer, E-Commerce is also gaining a lot.

In terms of, because it allows you, essentially have a worldwide customer base. You do not have to worry about a customer, who is your neighbor; provide of course, it turns out that the items are easily send across. It is a very heavy furniture, your customer is in America, the cost of sending, may be higher in the cost of furniture. So, the point really is one knows of course, what is the right way to do doing things. It is be your common sense.

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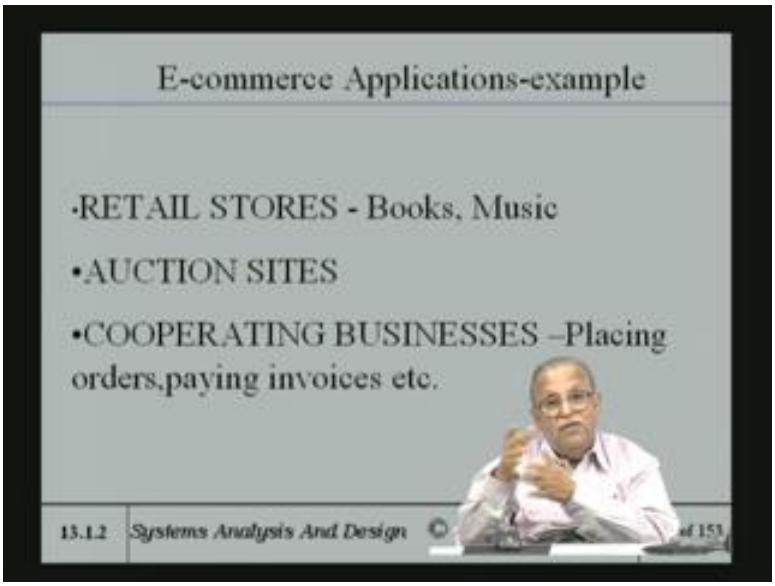

So, retail stores, where you know, retail stores like Rediff dot com is there in India, Amazon dot com, which is a book sale as well as music sale, which is a worldwide presence. Actually, it is an American company, which is a pioneer the business E-Commerce, selling primarily started with books. Later on, they started selling music and stuff like that.

In India, Rediff dot com came and of course, there is a site called India books dot com. where you can go and buy books, primarily Indian publications. And you do not have to go to, because it is good to go to the Indian publication, because the time to get your book. If it is published in India will be much shorter to go getting for the Indian E-Commerce site, rather than going to America.

Similarly, pentasol in India, which published lot of books, they have their own site, phidot com. So, you can go to phi dot com, if you want to buy any pentasol book, if you want to buy any pentasol India book, you log onto that website and ask for the book and then, they will give you the price and how much it will cost postage and so on. And also, they will say that, if you buy so much the postage will be and stuff like that. Of course, that is what, their web site will tell you.

The point is, it is a question of business, like a publisher or a book seller or a retailers in general. Trying to sell goods to customers and the advantage is that the customer can be anywhere, particularly for instance the books, books stores are not found in small places.

Large book stores are only found in big places and book stores, take a lot of space and we cannot display every book. Whereas, a retail book seller on a web, here electronic catalogue.

So, you got a huge catalogue of books, without having store having to store it physically. Once, you order it, he will kind of go to that particular publisher and buy it and or you know, ask him to send it you directly. And then, will do a transaction, other words, you effectively pay that person some money and there will be some agreement between that whole seller and the book seller, who is on the web.

So, the point, I am trying to make is that the virtual book shop on the web can in theory has infinite number of books with that having to spend money on the physical space. Whereas, a real book shop in a city is constrain by a space. They cannot have all kinds of books and it will be too un economical for them to store them. Because, it is all dead stock as far as, if it does not sell. That means, it is a dead stock.

So, the point really is that, slowly books, lot of books are being bought on the web. Of course, book stores still exist for different reasons, including we would like to go and kind of browse look at the feel of the book and kind of read the book and stuff like that. And the read randomly and decide, whether you want to buy it or not. So, that is, of course, that is exist, co exist, one will not vanish and the other will completely take over.

Because, but then, they turn out that a fair amount of customers were primarily earlier force to go to book store. And people in remote areas did not access to good book stores, they also have a chance now to be able to get to a book store, which is got a huge amount of data collection. That is huge number of book collection and there catalogue and you can order from that catalogue.

Now, auction sites are the one, which kind of, it is for customer to customer E-Commerce. In other words, you kind of put your item, suppose you have a second hand radio on sale, you say, I want 200 rupees for that and the seller may not be willing to pay 200 rupees. So, he will say, I will give 100, somebody else some other customer make 150. So, there is a kind of an auction and whoever bids the highest, gets that.

And the auction site is the broker, you might say, which E-Bay is a typical example of this kind of a broker, who kind of works between the seller between two customers. And

cooperating businesses, placing orders and in paying invoices and so on, which I talked about, that is B2B. This is B2B, C2C, this is C2B, to read from left to right, I will say B2C, C2C and B2B.

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Electronic banking is essentially, it is also something like B2C, the bank is the business and customer is the actual account holder. There is one electronic banking can also be B2B, because there are two banks, which we want to transact business between themselves. Like for instance, there is a so called electronic transfer of money from one bank to another bank. So, these two banks should be connected and money transaction can takes place interbank transactions can take place. Then, it will become a B2B.

A booking cinema tickets, trains and so on is another B2C commerce. In fact, in India today, the largest earner of in E-Commerce with the huge largest revenue is the IRCTC website, maintain by the Indian railways for railway train booking. They find that, they are literally selling crores of worth of tickets on that, using that website. And payment is primarily by credit card.

And so the train booking effectively became a very large B2C kind of an operation. And apart from that of course, even nowadays, even state transports or companies, bus companies have a booking. And of course, airlines companies, particularly cheep airlines in expensive airlines like Deccan airways and they have only electronic ticketing. They

do not really provide any kind of physical ticket, in the sense of your beautifully printed ticket, which is provided by the poor expensive air lines.

You can, in fact, there is no cost to them, because you print your ticket on your own computer and take that to the airline office. So, in fact, many of the other airlines are also started doing electronic ticketing. Because, it is an inexpensive of selling tickets and you do not have to pay the intermediate agencies stuff like that.

Electronic publishing, that is a publishing is where you effectively write a, suppose you want to write a book and make that book be available to lot of people. Instead of going to a print publication, you can do create a word document of a publication and put it on your website and people can just look at it. Because, the question of payment is a different issue all together.

But, you can effect, if you have got a book, which is of not great interest to lot of people, you may like to put it and make it available in your web site. Of course, there are now things like blogs and so on, which are there. That is primarily private blogs, your dad is more or less or your thoughts and so on. And then of course, not enabled by the internet, but I would not really call it commerce. In the sense of electronic commerce, we are talking about.

These filing tax returns government department like, today you can file your income tax return, using the World Wide Web. And that is exactly an example of G, to say customer to government customer being a tax payer and government being the tax collector. We say, customer to government, government to government, all these just like, B2B, there is also another set called G2C, to C2G, G2G and things like that.

And so, when governments come into a picture, but today in India of course, we filing a tax returns are is possible using the internet.

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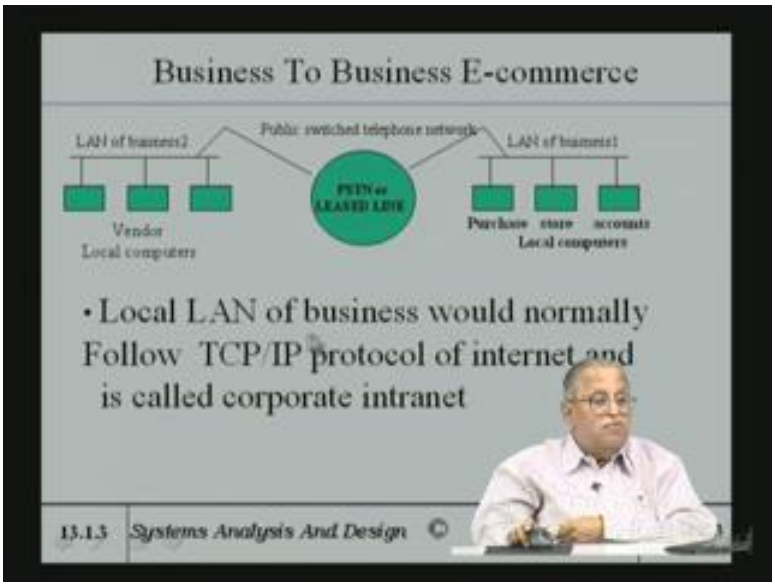

Let us just take an example of business to business E-Commerce. So, there is two business, each one has got a local computer network. They are all intranet and the other business, which wants to cooperate with this business also has a local intranet. We can call it business 1 and business 2. And they are interconnected by PSTN, Private Public Switched Telephone Network or a leased line.

Depending upon, you know, how much transactions these people carry out. If they are carrying out lot of transactions and they privacies very important. There is security is very important, more than privacy, in fact, security is very important. They do not want anybody to intrude and then, they effectively put a private or leased line, which is not accessible to everybody else and that is more expensive.

So, depends upon, how many transactions, you people carry out in between among themselves and that is the importance of security and stuff like that. But today of course, a trend is more and more going towards public switch telephone network, using some encryption for communication. Primarily, because using the public switch telephone network is much less expensive. It is in inexpensive; it is inexpensive compare to having a leased line.

So, one goes towards, essentially you might say, PSTN with some security embedded on to it. So, local LAN of businesses would normally follow TCP/IP protocol of the internet. And of course, I call it of course, corporate intranet. We discussed it earlier in

another module. So, this is one intranet, this is another intranet, they connected. And when they connected, this is called extranet. They have an extranet here; that was connection between two intranets of two different companies.

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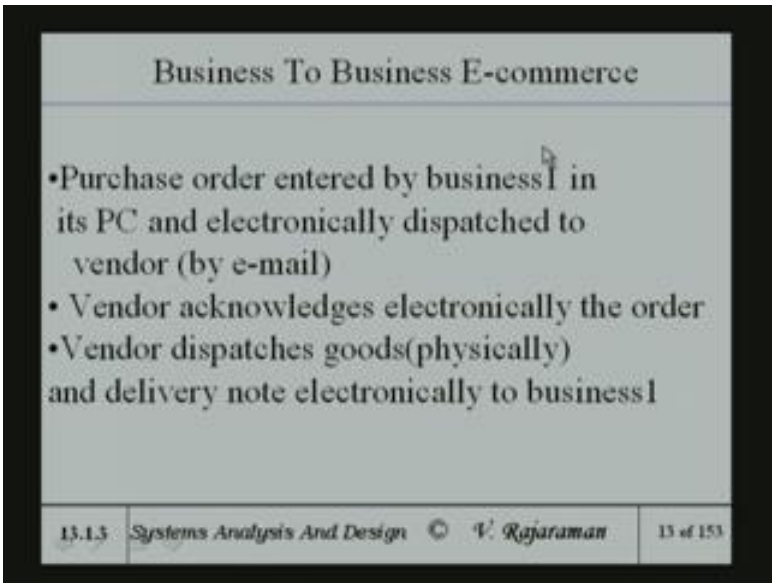

So, giving an example of purchase of taking the purchase order. Suppose, that there is a question of vendor and purchaser. Purchase order entered by the purchaser in it is PC and electronically dispatched to the vendor by email. So, you say everything is electronic. So, you do not have any paper document. You send it electronically, that is you enter it on your computer and send it as an email attachment. You might say to the vendor and vendor acknowledges electronically the order.

So, the order acknowledgement comes right away, again as an email transaction and vendor dispatches goods physically and delivery note electronically to business 1, which I talked about earlier.

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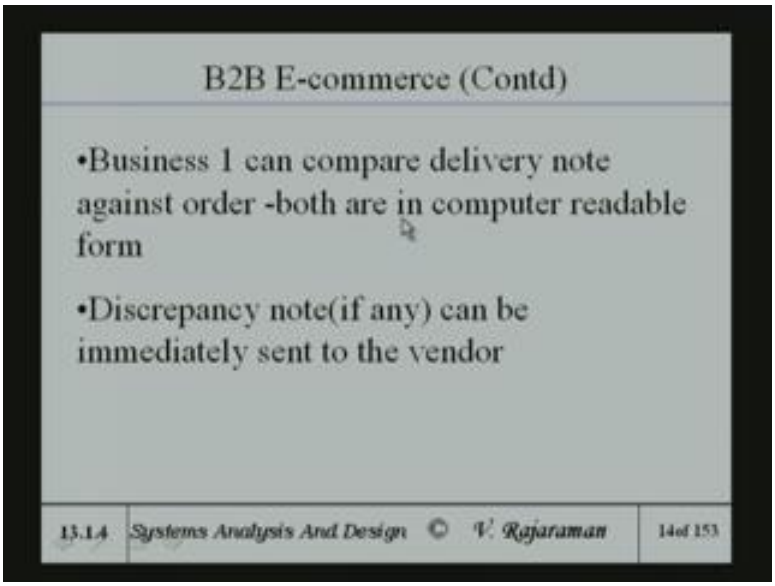

And business 1 can compare delivery note against order. Both are in computer readable form, because both are generated by the computer, you can compare them by computer. So, it cost it is very, very fast. There is no manual comparison and discrepancy note if any, can be immediately sent to the vendor. In other words, there are two different types of delivery notes. One which comes electronically, the other will come with the actual physical goods, which will be normally a paper.

But nowadays, we are sending a lot of goods, what you do is, you go to a truck driver floppy containing the entire, you might say, the chellan containing all the items we are being sent. So, in which case, it is electronically coming and you can actually take on your computer and compare.

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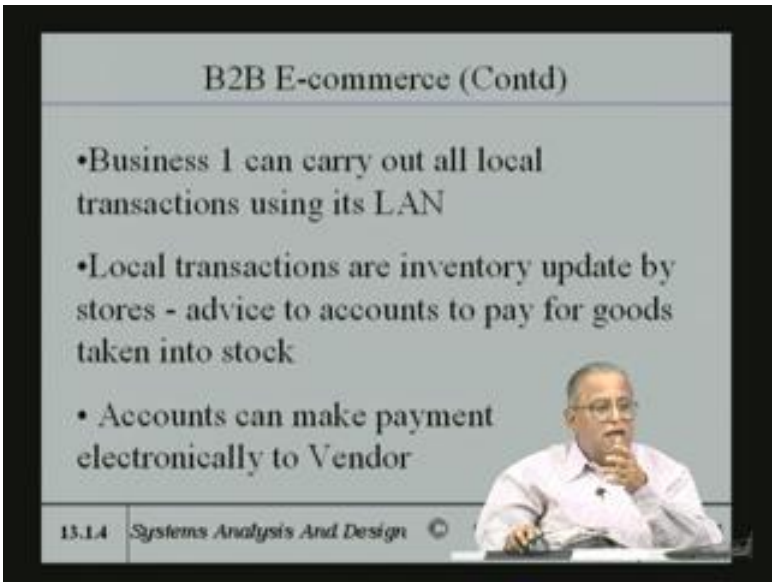

And all business one can carry out all local transactions, using their own LAN. Local transactions are inventory update by stores advice to accounts to pay for goods taken into stock. Accounts can make payment electronically to vendor. So, these are the major kind of advantages, because each business can carry out their businesses in their intranet. And then, through businesses, they communicate very effectively.

And this will lead to lot of requirements and these requirements are types of electronic data interchange, payment systems and all those, which really constitute the heart of E-Commerce. And I am going to talk about these in great detail in the succeeding lectures.

Thank you.