Course on E-Business
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Lecture 34 Interoperability Of information System

Welcome back. We will continue our discussion on Technologies for supply chain. In this context we are going to study about the interoperability of information system. In particular in this lecture we are going to discuss the dimensions of interoperability with one example.

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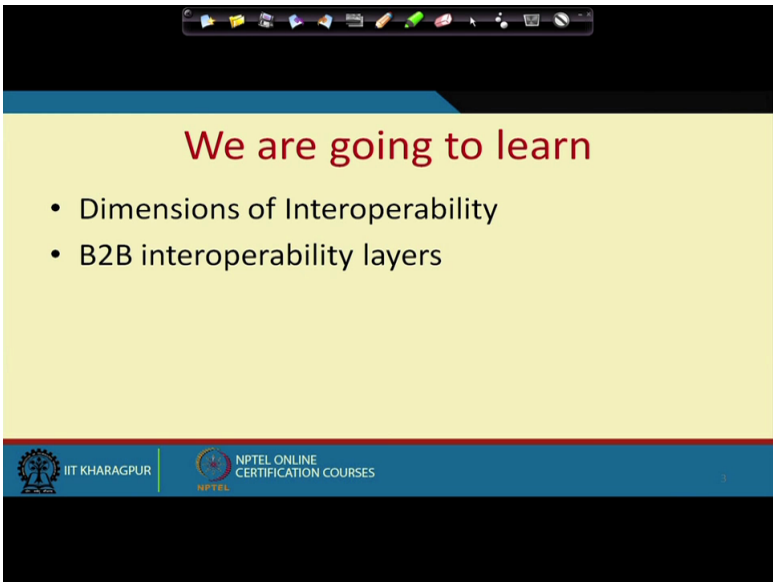

In fact will continue the BMI example that we did few classes back then we will be talking about B2B interoperability technical layers.

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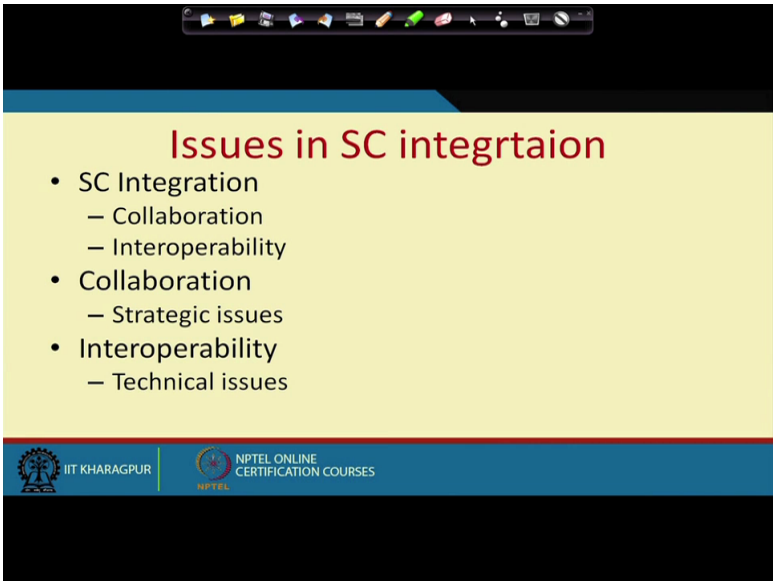

So while talking about this supply chain integration issues, we saw that the supply chain integration basically consists of two parts. One is supply chain collaboration and another is supply chain interoperability. While supply chain collaboration deals with managerial issues which are most strategic it is interoperability deals with technical issues.

These all the details of all this things with some examples of various problems in interoperability we did in one of the previous classes and I expect that that knowledge people have while going to this lecture. So that understanding will continue with that example that we did in that class about this vendor managed inventory system.

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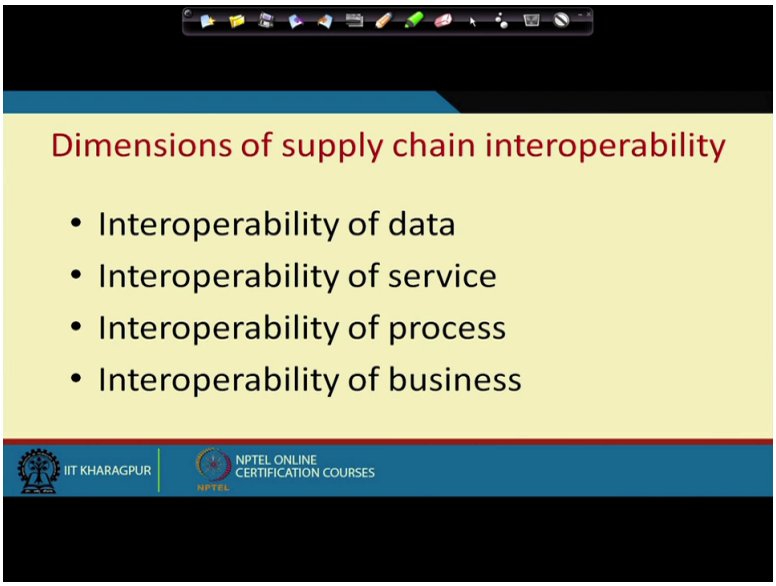

Now we have also know in that class that this interoperability has four dimensions in fact we discussed about this interoperability of data and interoperability of service but there are two more dimensions which are interoperability of process and interoperability of business. Now because we have little bit of technical background build up so far will be able to understand this points later.

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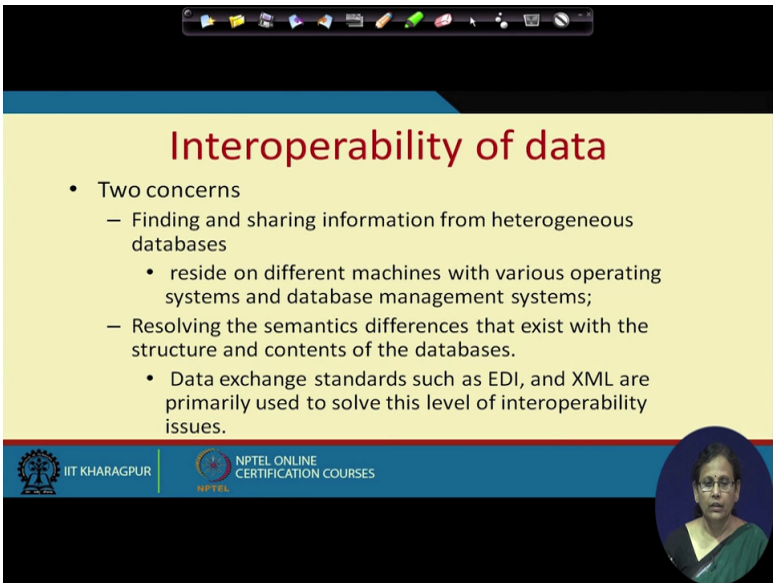

Now when it comes to interoperability of data two measure concerns are under this. First finding and sharing information from heterogeneous data bases is a problem. Why it is a problem? Because the result on different measures which have different configurations, different operating systems, different database management system and so on.

Then second concern here is while we also have to not only we have to make this technical compatibility possible. But we also have to resolve the scemantic difference that exists with the structure and the database. The data extend standards such as EDI and XML are important. We are going to study about them and we are going to find out how they are able to solve the interoperability problem at this layer.

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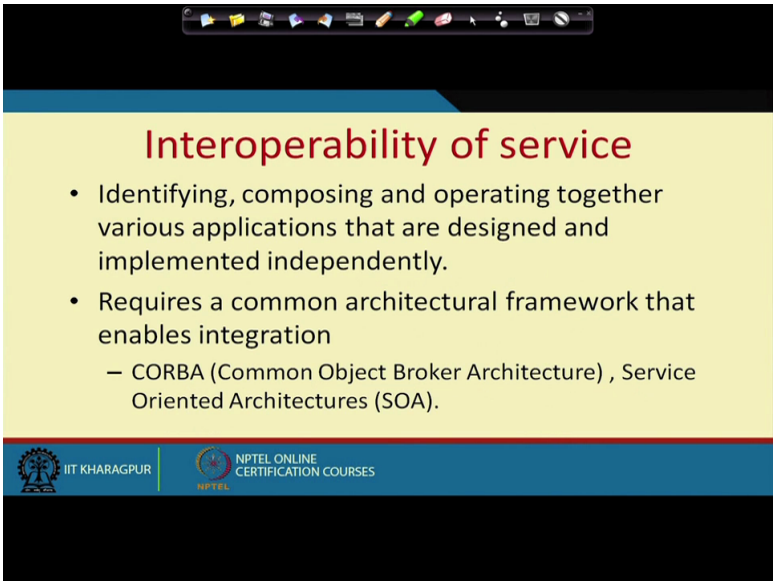

Then consider interoperability of service. it is about identify, composing and Operating together various applications that are designed and implemented independently in fact last class we did not discuss about this interoperability of service but because we were not in a position to have the adequate background for this one but anyway while talking about this will know about about various architectural Framework which enable such integration.

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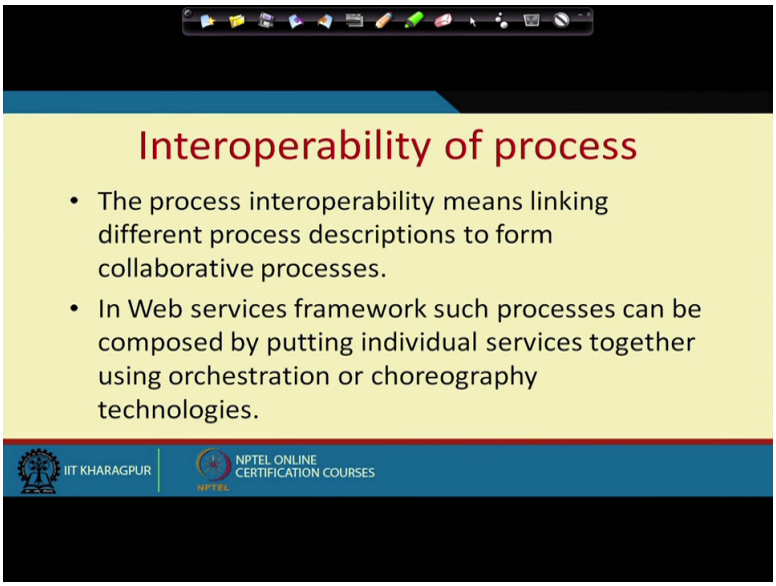

Then fourth is the interoperability of process. This process interoperable linking different process description to form collaborative processes in this context while a service interoperability of service requires integration of two nodes in a workflow by interoperability process we mean integrating all the notes in a workflow. So that one entire business process can be conducted.

So this for this one will be talking about how to extend this web services or how this Web Services framework is extended to handle complete automation of a business process of complete automation of a workflow.

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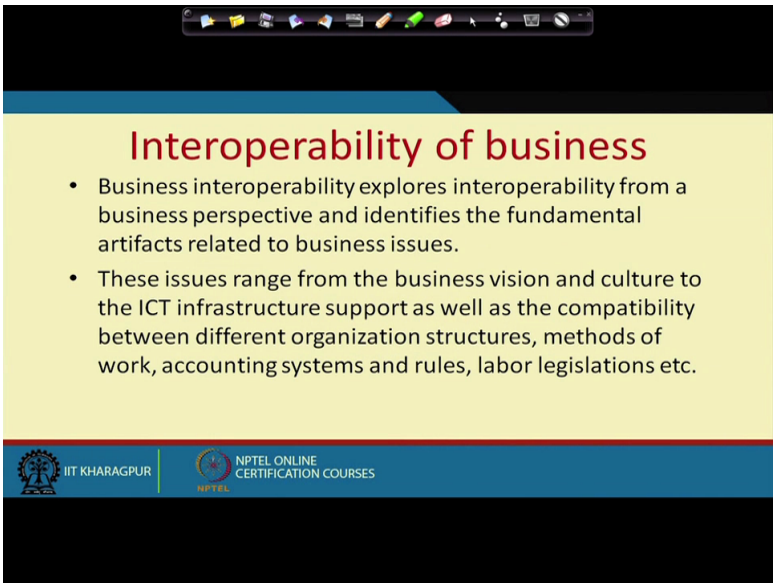

Then we are going to talk about interoperability of business. They are technical but they also require something which is beyond technology concern. For example if you are going to automotive business process which is inter organisational, look here we are talking about interoperability of process data etc etc it is with respect to two different organisations. That is why the systems are different.

So while we do talk about such interoperability of process interoperable process we need to we have the concern of combining all the legs in a workflow. This by all the legs I mean the entities which existing in the workflow they need to communicate and this communication of all the entities makes the workflow.

And that work flow when we considered workflow across two organisations then a part of that maybe in one organisation and another part of that process maybe in another organisation. So if while implementing this if there is if it is necessary it both the organizations may agree upon to reengineer their original process. So this interoperability of business is about resolving all the technical issues along with reengineering the entire business process if necessary.

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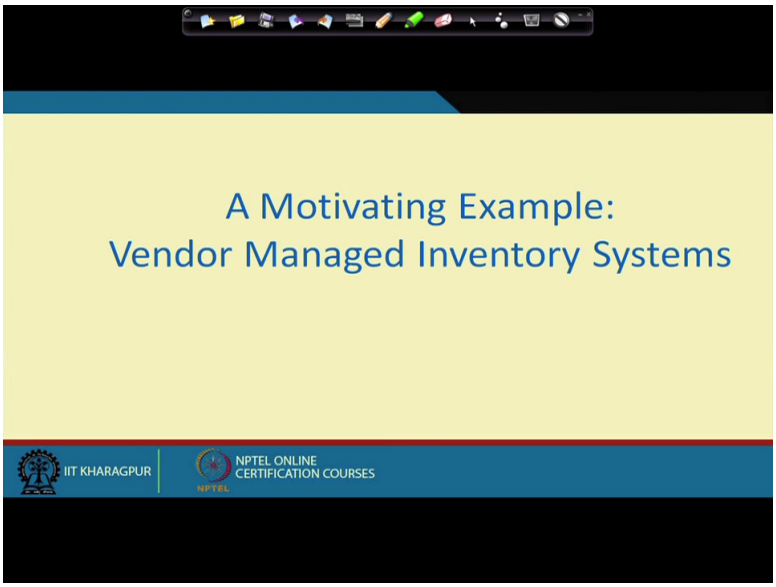

We continue with that motivating example of vendor managed inventory system and this example we discussed in one of the earlier classes. Now we are going to see what are various I mean what are various compatibility issues coming here and how this can be resolved? In fact we are going to continue with this this example in a many of our in some of our subsequent literature lecture. Again let us remind you about this vendor managed inventory system.

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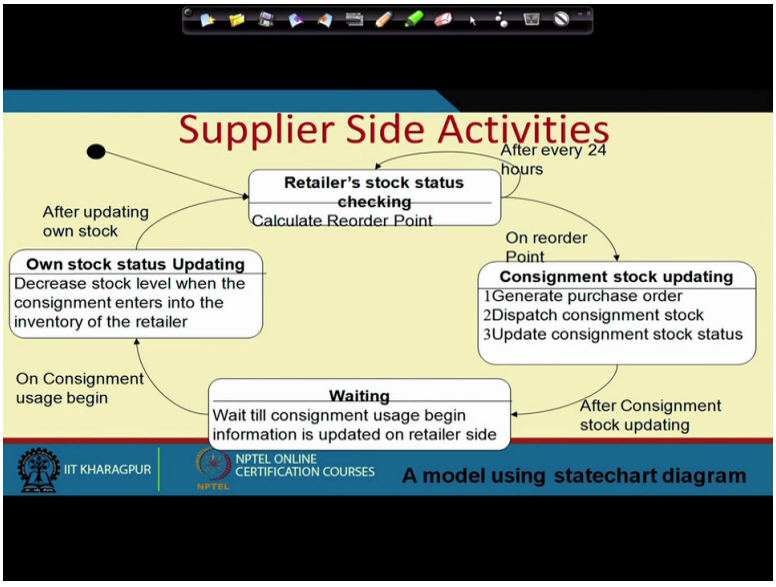

In the vendor managed inventory system the supplier takes care of the retailers inventory. So in fact the retailer shares his point of sales data as well as his stock level in the retail store. So

that accordingly the supplier makes his plan to supply the items. So this two cycles are executed one at the supplier side and another is the retainer side.

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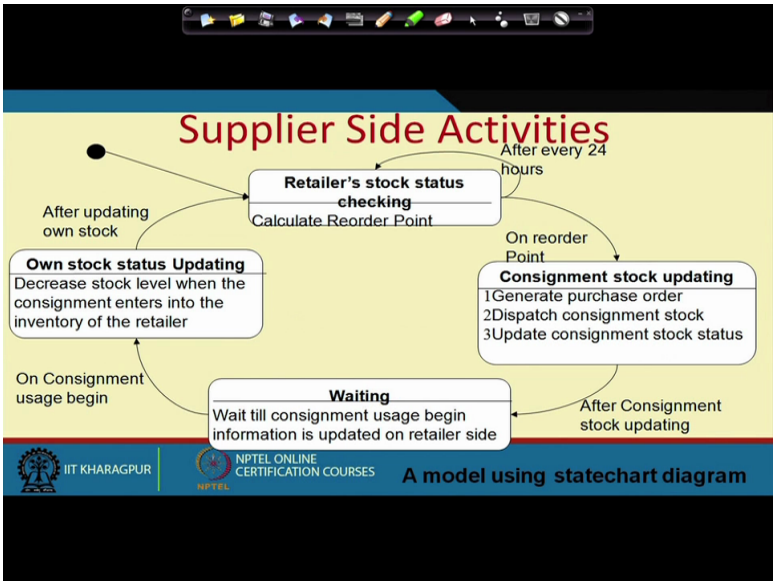

So when we talk about a workflow and the activities within this workflow look this is one activity maybe some entities responsible for this activity of course it is automated you cannot assign in human being but some program is responsible for doing this. Then this program is connected to another program.

Again another program and so on. This is how this whole process of retailers stock status checking consignment stock stock status updating, waiting and updating the stock status when the consignment stock uses begins at the end of the retailer this whole cycle continues.

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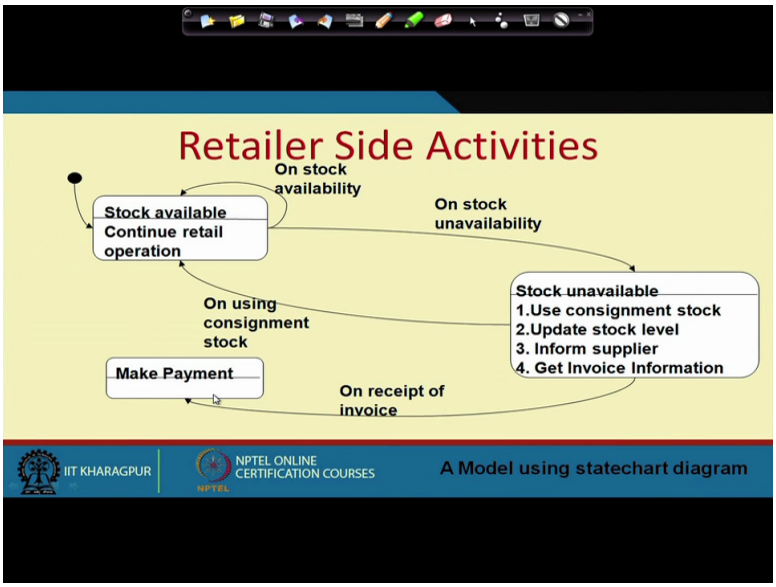

Similarly at the retailer side as well we have this whole process repeated every time. Every time the consignment stock is sent and it is opened. This whole cycle keeps repeating. so if this process look we while talking about different types of decision making scenarios we learnt about some (())(9:44) structured, unstructured and some are transaction type. Here basically if you look at here there is absolutely no Complex distance making scenario.

It is simply repetition of some transaction that has to happen because of the (())(10:06) contract which you can set a strategic level made by the buyer and the supplier.

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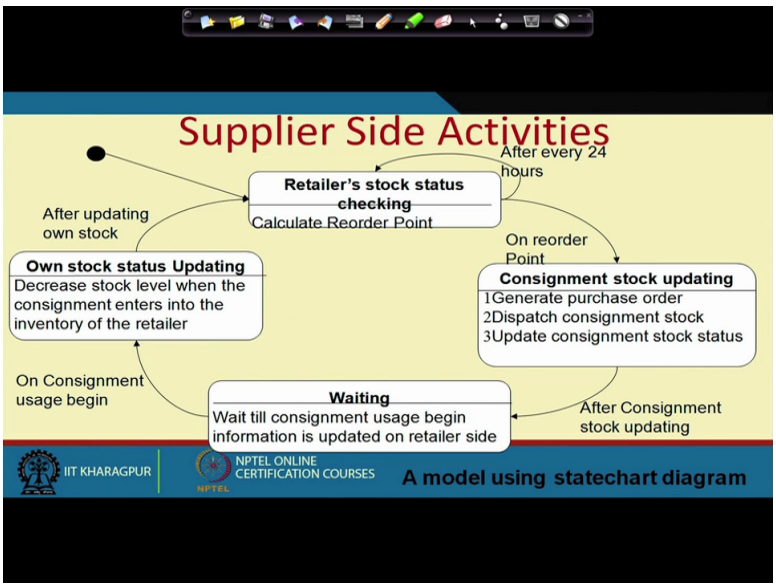

In fact if you look at this may be possible this calculation of reorder point requires little bit of some transaction level decision making but otherwise it is all simply updating the stock, repeating some activities only.

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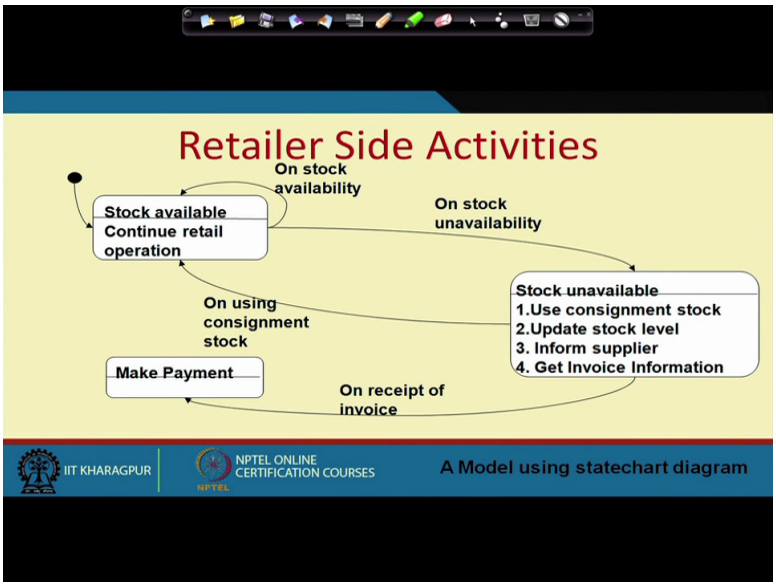

So let us try to figure out what are various issues that come up while automating this process at both the end. Then connecting both these processes now where exactly the connection is taking place?

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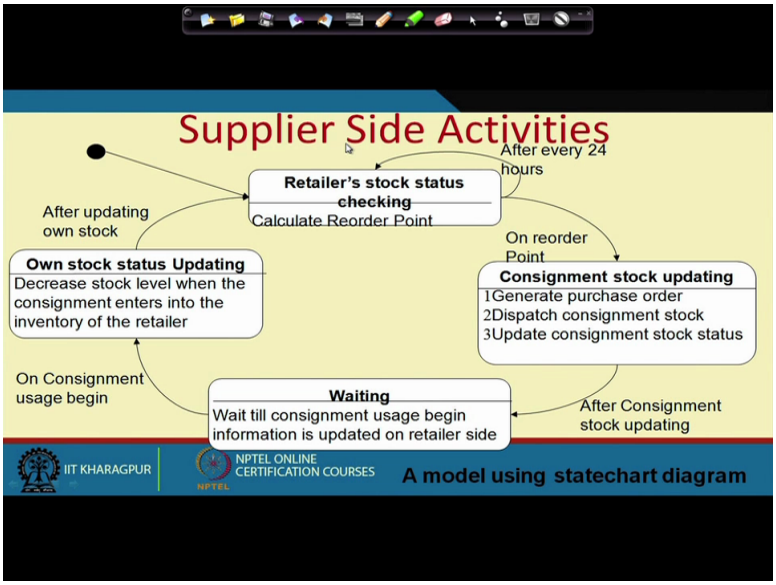

Here connection is taking place. The retailer is checking the supplier is taking retailer stock so it has to get that information from retailer side. Here of course it is doing his own activities

are supplier is doing his own activity here also it is doing his own activity but here it is again getting some information from the retailer that retailer has started using the consignment stock.

In fact he is also providing some information like the purchase order generated at his end and then dispatch dispatch status of the consignment stock etc to the retailer as well.

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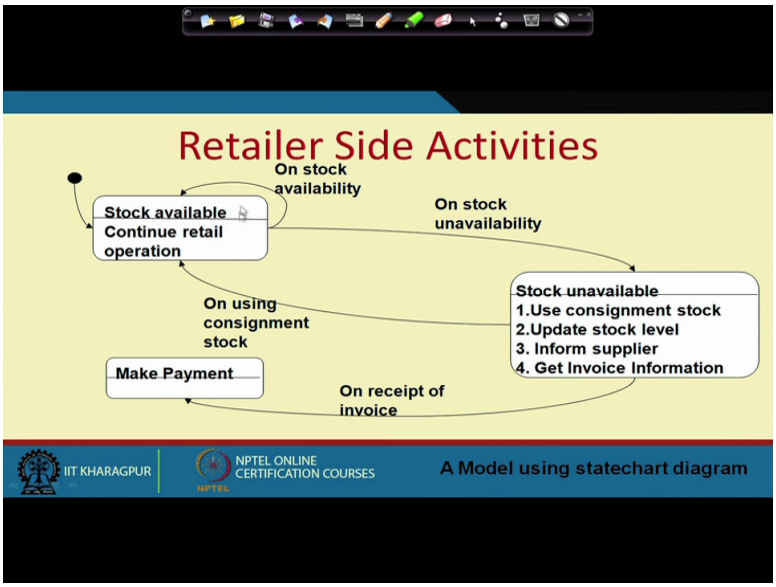

Here also at the retailer side, retailer is responsible for providing this stock information to the supplier and it also sends varieties of information like when it starts using its consignment stock he informed that the supplier then when he receives the invoice, he also inform the supplier about the payment process initiation of the payment process.

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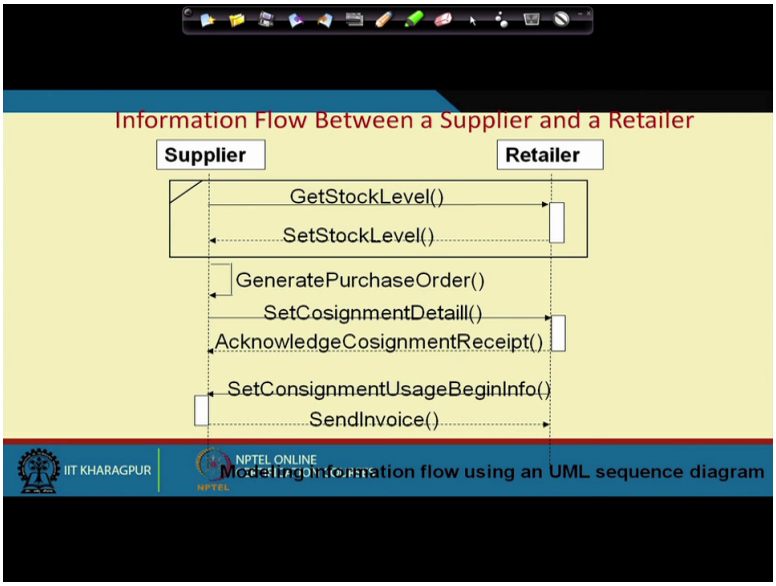

This is the information flow from supplier to retailer. Supplier request retailer to get the stock level retailer sends the stock level. Suppliers purchase the purchase order it sends the sends the consignment stock detail and send it send it to the retailer. Retailer acknowledges the receipt then when it starts using the consignment stock, it informs a supplier and supplier sends the invoice.

So in order to automate this you can in some of the places supplier is the entity who is initiating this flow and sometimes retailer in fact this is dotted lines are the retailers. Whenever Retailer initiates any retailer sends any information. It requests, it sends.

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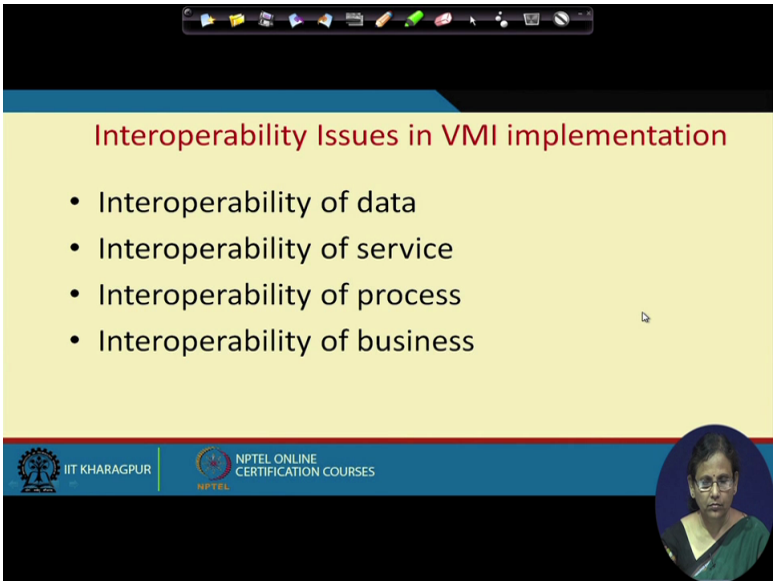

Let’s try to see how exactly this all these terms are relevant in case of VMI implementation.

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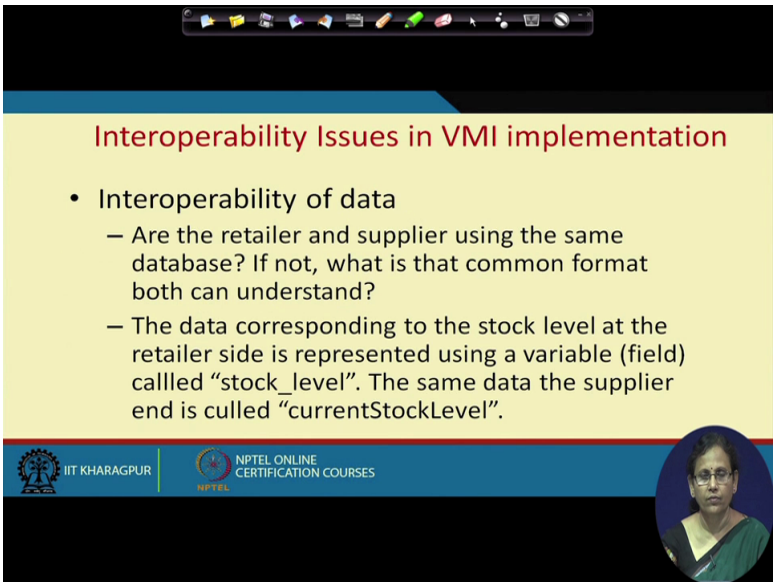

Start with interoperability of data. There are various data items during information flow we saw there are various types of data items which is sent from the retailer to the supplier and from supplier to the retailer. Now consider now consider the fact that while sending this information when it is going to stay send going to be stored in the database of the either side is there any common format they are using?

If somebody is using a database DB2, somebody is using database of Oracle where the schema information the description of the items are different different then how is it going to be handled? For example consider that stock level is some data which is let’s say coming from the point of sale point of sale source of the retailer to the supplier. Suppose at the retailer side this point of sale device is attached to the retailers ERP system.

So it captures this point of sales data and this data lets say the stock level data the retailers system gives a name called let's say the stock underscore level. So when the data will be sent to the other side data will be send as a pair of the name and value. So the name of that item is stock level and their value will be maybe some 10 unit, 20 units and so on.

So when this name value pair is sent to the other end because without that name simply you sent the value. It is actually meaningless. Simply sending 20 and what does it mean? It indicates nothing. It can be 10 mangoes, it can be 10 anything, 10 trucks, it can be anything.

So a name has to attach to the data. So now the name which is attached with the retailer is stock level.

So at the receiver side that is supplier side suppose to indicate the same same data it uses the term current stock level. Then unless otherwise there is they resolve the fact the stock level stock underscore level this one stock underscore level that is this fact is this one is same as that of the current stock level at the supplier end stock level and current stock level. AT both ends are same there will be a problem in understanding the data.

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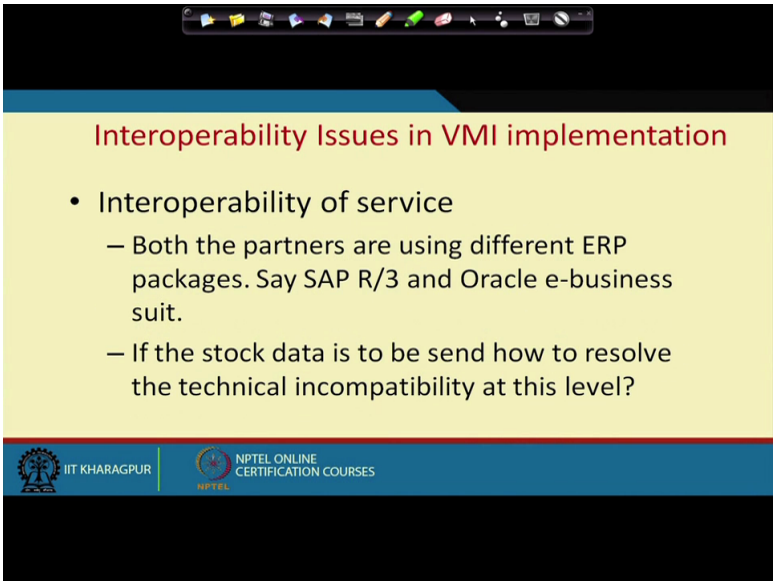

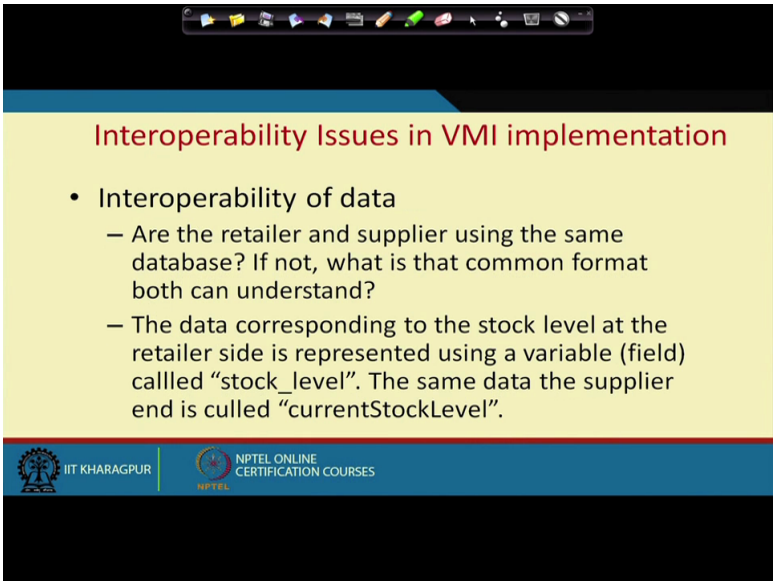

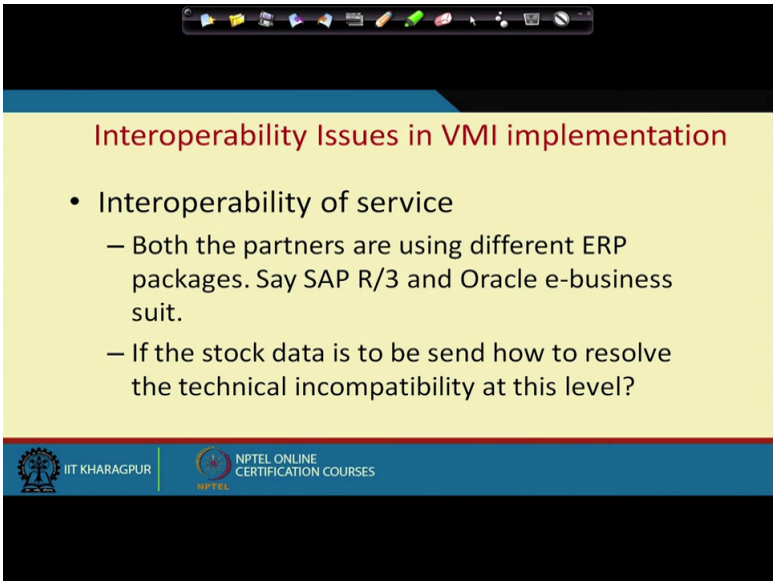

Then interoperability issue at the service level. So interoperability of data interoperability next one is interoperability of service. Now we're talking at much lower layer. Whether the we are talking about the data elements and their name value pair. Now this data where it is stored? This is stored in the corresponding in the data bases of the corresponding ERP system. Assume that both the parties have their own ERP system.

Now assume that this data when it has to move it cannot go directly to the database. It has to pass that has to be some ERP, it has to provide some interface through which the data has to be entered to the to the database. Assuming that both the parties have two different ERP systems lets say one party has SAP R3 and other party has Oracle e-business Suite. Both of these are ERP application packages.

Are they compatible? In order to make both of them compatible to send and receive data what has to be done? So this issue is the problem at interoperability level. Then come look at the interoperability of concept of the interoperability of process. At both retailer and supplier side we saw some cycle is happening and that cycle the transaction cycle continues to happen and that transaction side cycle involves several data exchanges.

So it is not one service which can automate this whole process. a number of services has to be together working towards automatic that complete workflow that complete transaction cycle. So in this context the problem is how to correlate this small individual data exchange steps so that the whole process is automated?

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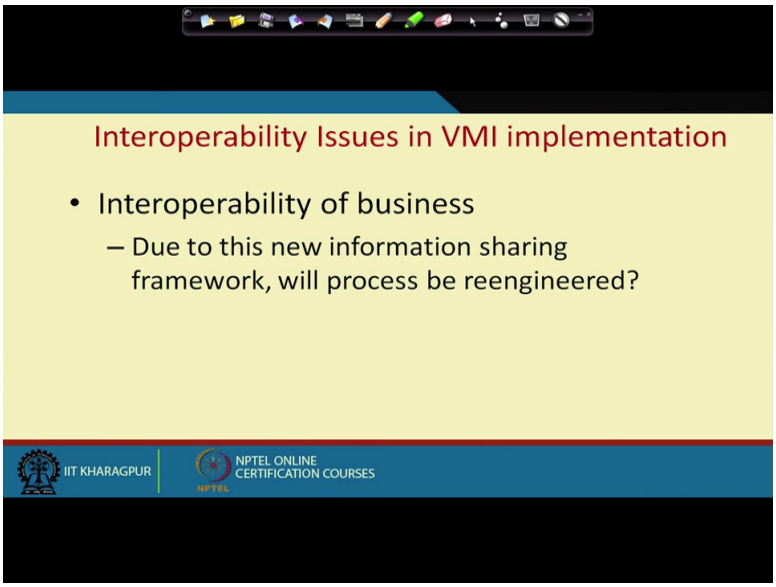

Then you have the interoperability of business. Now because of suppose the companies are first time adopting this VMI and their going for developing a information system which will automatic inter organizational workflow. Now due to this new information sharing framework, will the process be reengineered? This is the interoperability issue at the business process level.

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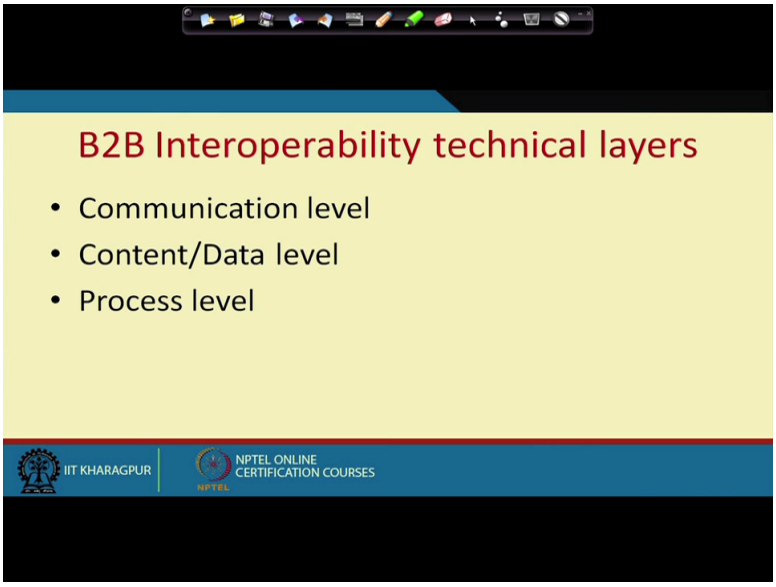

Now let us see little bit more technical. This interoperability technical layer tells us how exactly the data has to be exchanged between two entities to automate the process. We start with a communication level first.

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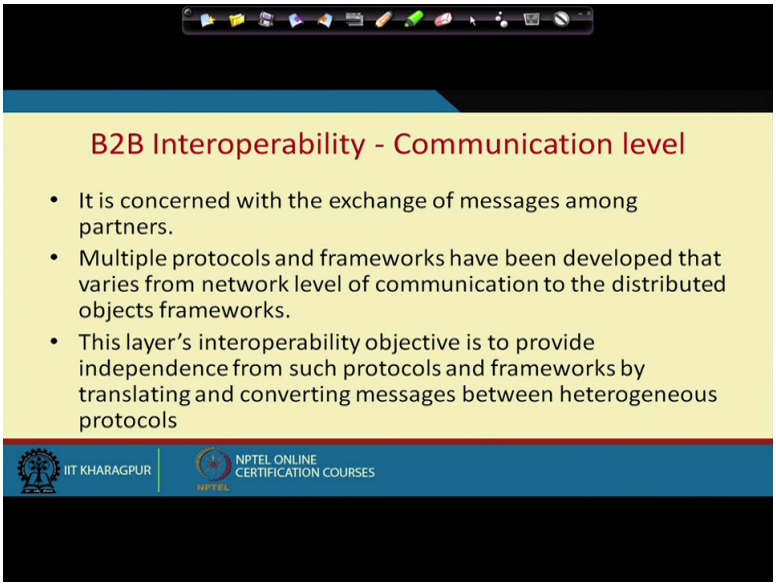

It is the lowest level and in this level multiple TCP IP etc protocol has to be there at the lowest level and multiple protocols exists and we expect that all these protocols should be compatible with each other.

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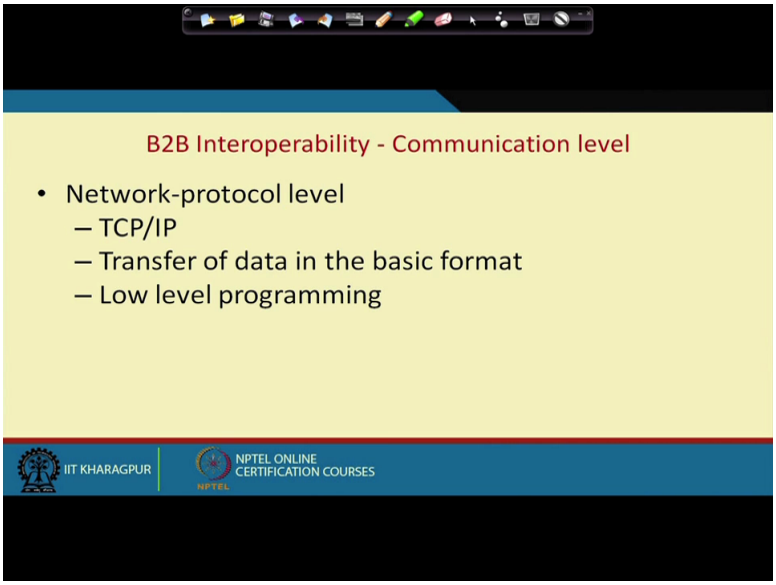

So at network level as I (())(19:56) you various TCP or IP protocol is there and transfer of data some there are some basic formats and all this for making them compatible compatible is not the work of information system but information system is hosted within a network. So therefore unless otherwise this network level compatibility issues are resolved two networks cannot be communicating.

Then at this level for making two different systems work we have the idea of this remote process remote process invocation. Remote procedure call for remote method invocation particularly in a programming language language like JAVA so in case of this remote procedure calls which is associated with some object oriented terminology and to in the object oriented world.

If the both the parties implement the information systems which are object which uses some kind of object oriented technology then in order to communicate with each other the objects at both the ends need to be connected. The message has to pass between the object at both the ends.

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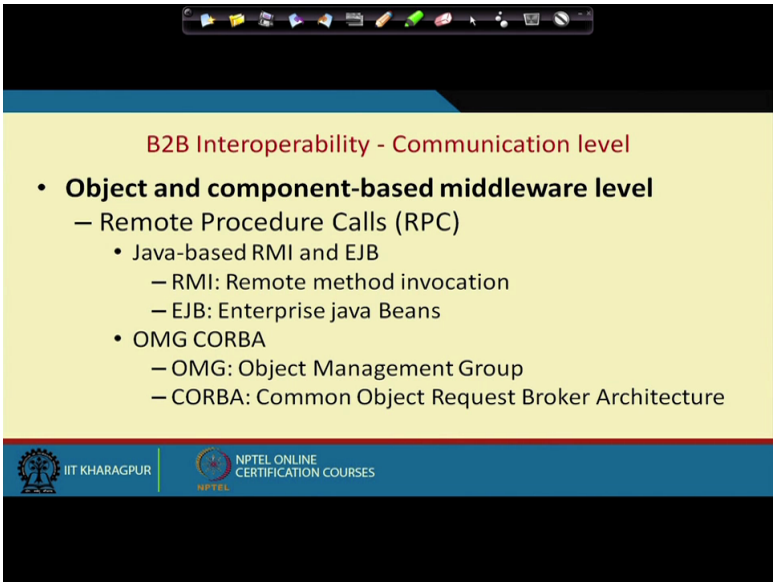

Now how exactly it is possible? This is possible. See each object has two parts. One is its attributes. Second is the methods methods the operations which which are carried out on the attributes of the of the object. So in order to pass the message to the object or in order to communicate with the object which is the basic entity of information system building we should be able to make a call to that entity to the procedure of that entity.

Now that both the information systems reside in two different locations have two different technology maybe then how exactly this communication takes place? There are various engineering this is called the remote procedure calls but there are the reasons for example Java implement something called JAVA RMI this is remote method invocation but there is but that become JAVA technology independent.

Now there is another standard which actually is makes it tries to make it technology independent and platform independent. So this technology is called object management groups. Some common object request broker architecture so if both the interacting parties follow this common architecture the object that need to be communicated then it will aligned with this architecture. As a result they will be able to communicate from remote places even if they stay on to heterogeneous systems.

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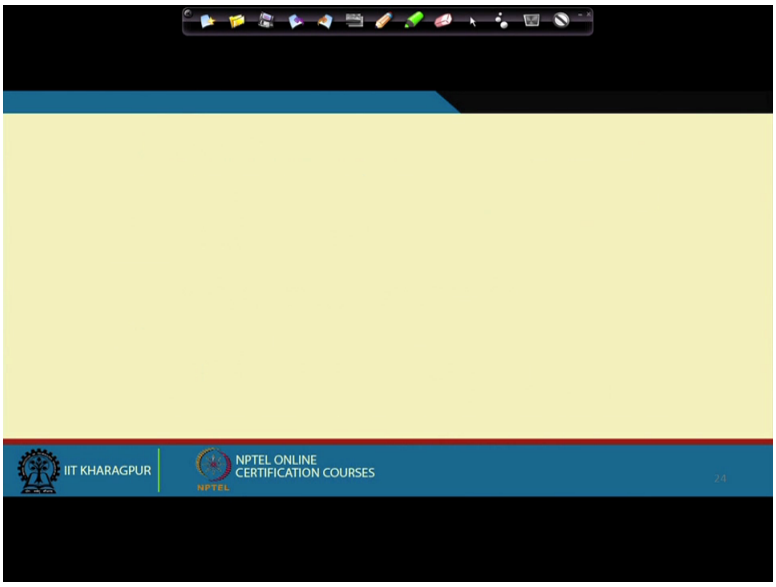

With this we finish this lecture on communication at the interoperability at the communication layer. Next class will be talking about the interoperability at the content on data. Thank you very much!