Introduction to Internet of Things
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Lecture - 08
Basics of IoT Networking- Part- IV

So, we continue with few other protocols and now, we are going to look at one very interesting protocol which is bit different from the previous protocol that we have been discussing in the context of basics of networking, IoT networking.

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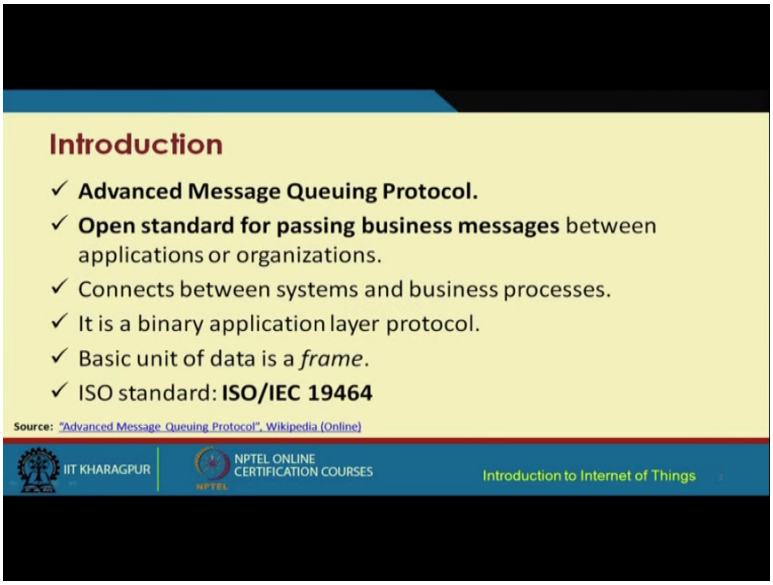

So, this protocol is the AMQP protocol and the full form of which is Advanced Message Queuing Protocol and this Advanced Message Queuing Protocol basically follows some kind of an open standard which is based on the ISO. So, it follows, basically ISO IEC 1964 Standard.

So, this standard basically helps define how mistis are going to be passed from businesses, business applications or organizations. So, in other words, a particular business is comprised of different systems and different processes, business processes. So, a business can be conceived as a collection of different systems and business processes. So, this particular standard helps in communicating between these systems connecting rather connecting between these different systems and the business processes of that particular business.

So, it is a binary application layer protocol. It is an application layer protocol and the unit that is used for data transfer in this case is known as the frame. So, it is bit different from the concept of frame in the link layer. So, you know here also it is known as frame, but it is not exactly the same frame that we talked about in the context of link layer protocols.

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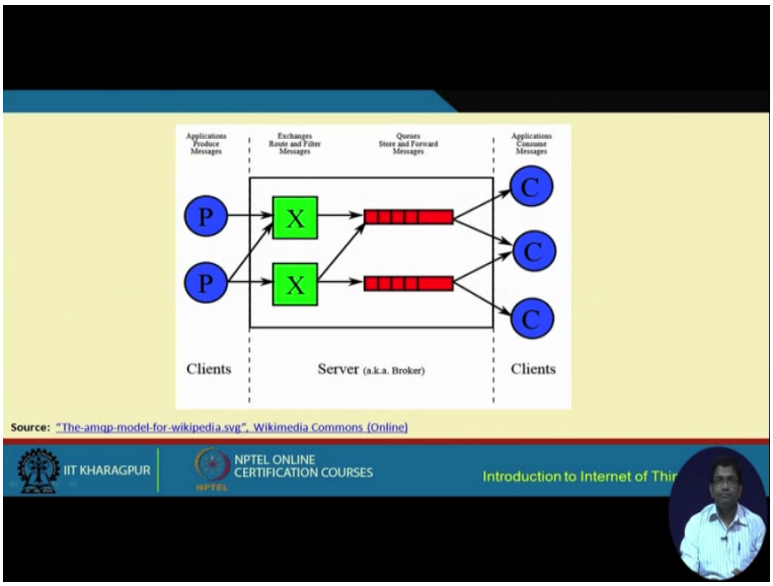

So, let us now try to understand how this particular protocol works. So, we have clients which are producers of different messages. We have a server and on the other hand, we again have a layer of clients which are consumer of the messages. So, we have the producers of the messages, we have the server which comprises of routers and filters and queues for forwarding the message, for queuing and for buffering and forwarding the messages and then, we have the consumers of the message. So, this server basically acts as a broker, the server acts as a broker.

So, essentially what happens is these clients for example, different sensors they produce different data. They produce different messages. So, these messages are sent to the different routers and filters in this manner which again can be buffered in a queue and with the intention of forwarding them again in the future and these data, the forwarded data beyond the server are sent to other types of clients which are the consumers of these messages. So, we have the producers, we have the server in between and we have the consumers.

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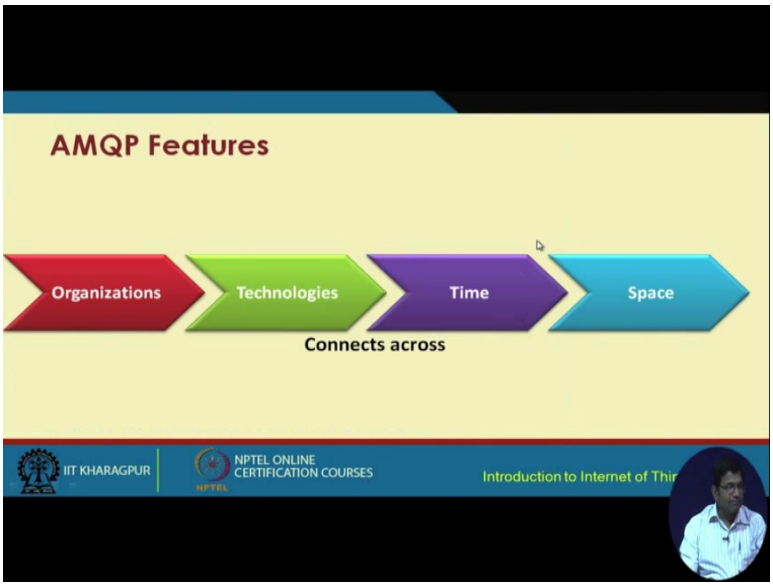

So, AMQP can be thought of as a collection of different features. These features basically cut across things such as organization. So, basically AMQP can help in connecting different organizations, connecting different technologies, connecting different organizations with respect to time and that means, at different points of time and the technologies and the organizations that are located in different locations connecting them as well.

So, these are the main features of AMQP. So, connecting organizations technologies time and space which could be distinct from one and so, distinct organizations, distinct technologies you know with respect to time variations in the space AMQP basically helps in connection.

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Few other features from a different perspective AMQP supports security reliability interoperability I think, security, and reliability are understood. I do not mean to elaborate on them further, but in terms of interoperability, we are basically referring to interoperability of not only devices, but also protocols, algorithms messages and so on.

So, this is the next feature and then routing of messages queuing of messages and that it follows an open standard which is based on ISO.

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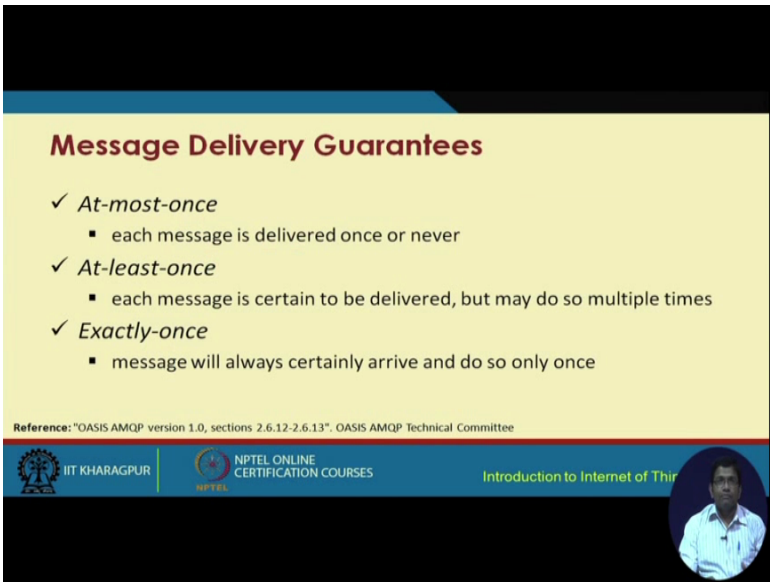

So, there are different messages that are involved in this particular protocol and what is required is to have message delivery guarantees. These message delivery guarantees can be in three different forms. The first one is at most once which means that each message is delivered at most once.

That means, once or never to the intended recipient. At least once each message is certain to be delivered, but may be multiple times, but it should do at least words exactly once messages will always certainly arrive and do. So, it is only once. So, these are the three different messages, types of message, delivery types and guarantees that are involved in this process.

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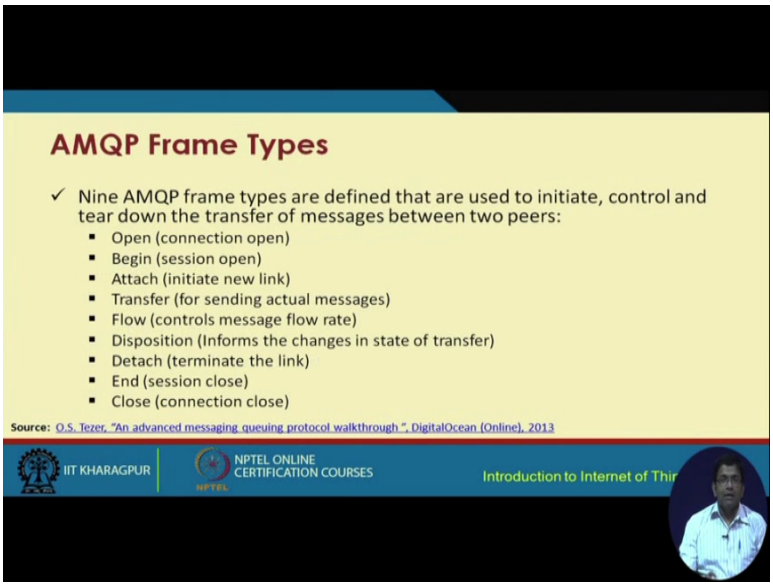

So, the different frame types there are 9 AMQP frame types that are used for defining to initiate control and tear down the transfer of messages between two peers. So, we have the first one, the first frame type is the open frame type which is used for opening a connection corresponding to this. We have the closed frame type which is for closing the connection. Then, we have the begin frame type which is for opening a session and correspondingly we have the end which is for closing that particular session.

Then, we have the attach which is basically used for initiating a new link transfer for sending actual messages flow, for controlling message flow rate and disposition that informs the changes in state of transfer and then, we have the detach which is for

terminating the link. So, open, close, begin, end, attach, detach, and in between we have transfer flow and disposition frame types.

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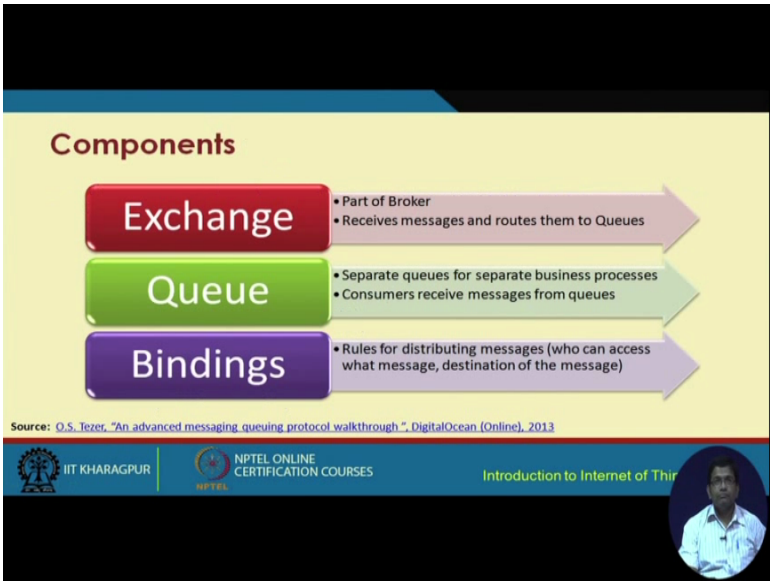

So, the different components of this particular protocol include three things, three primary things. One is exchange, the second is queue and a third is bindings. So, the exchange component is basically part of the broker that is in that is task to receive messages and route them to the queues. Queues are basically separate for different business processes.

So, different separate queues are used for different or separate business processes and the consumers receive the messages from the queues. Bindings are rules for distributing the messages which means that who can determine who can access what message, the destinations of the message and so on.

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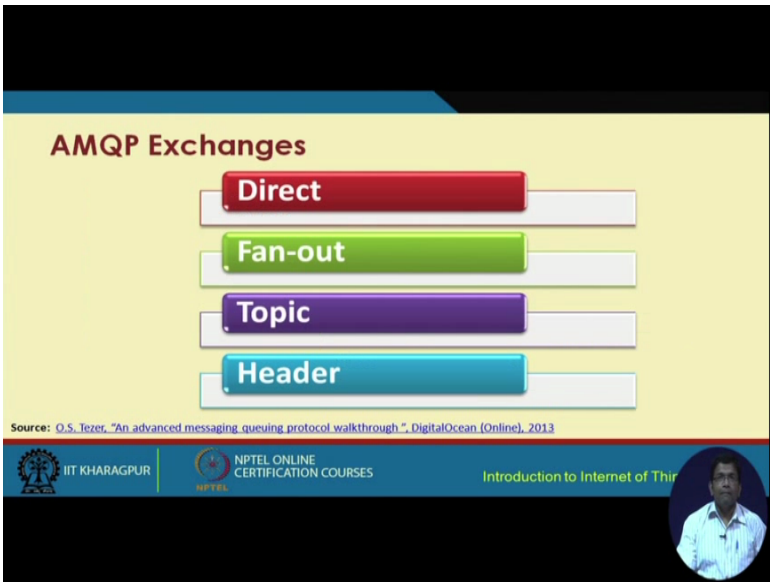

So, we have you know different exchange types in the case of AMQP. AMQP has basically four different exchange types. One is the direct, the second is basically the fan out, the third is the topic and fourth is the header. So, these are the four different AMQP exchanges. So, direct exchange fan out exchange, topic exchange and header exchange, we are not going to go through these in detail just to keep things simpler and easily remembering. So, that is the reason we have not discussed these in further detail.

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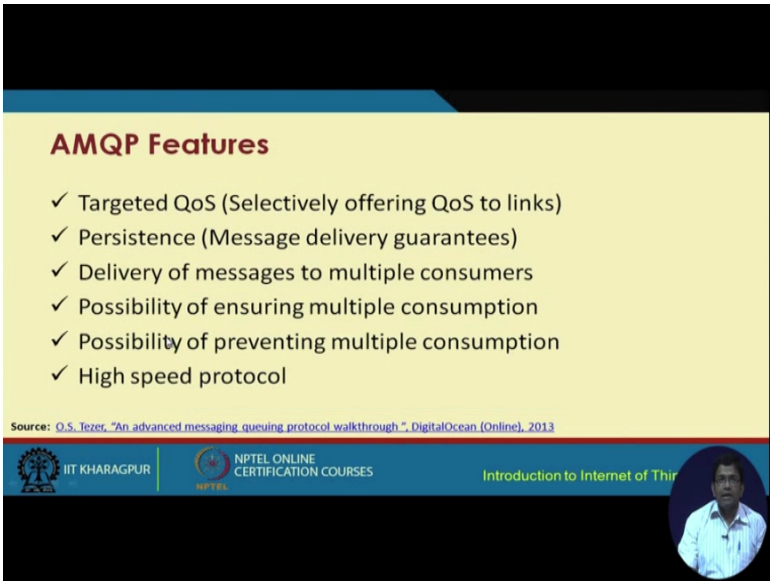

So, these are some of the features of AMQP. It offers targeted QOS which basically targets selective offering of QOS to certain links persistence which basically implies MES offering message delivery guarantee, then we have the delivery of messages to multiple consumers, the possibility of ensuring multiple consumption, possibility of preventing multiple consumption and high speed.

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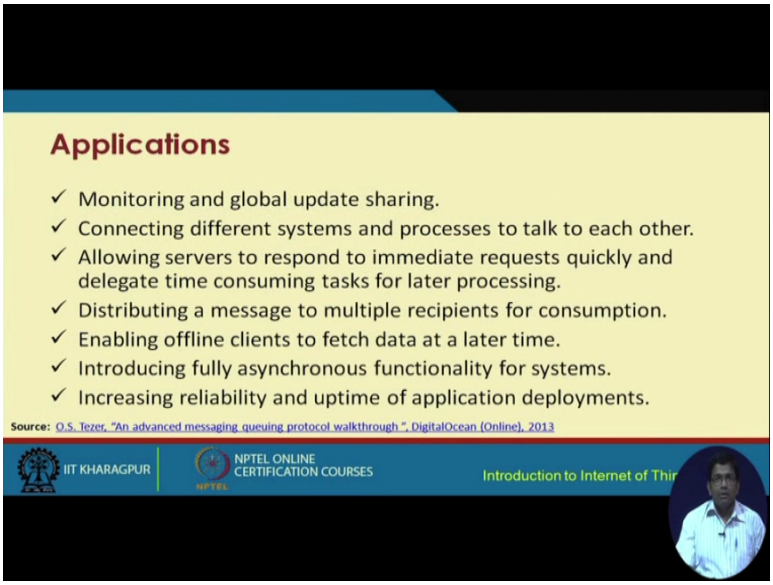

In terms of the applications, it can be used for monitoring and global updates, sharing applications, connecting different systems and processes to talk to one another, allowing the servers to respond to immediate request quickly and delegate time consuming tasks for little processing, distributing a message to multiple clients for consumption, enabling offline clients to fetch data at any time and increasing the reliability and uptime of application deployments.

So, this basically concludes the discussion about this protocol. So, with this we basically come to an end of the series of lectures on the Basics of IoT networking and in the next lecture, again we will look at few protocols, but the perspective from which we are going to look at is going to be different. So, there we are to look at protocols that are very much useful and that are used for establishing connectivity in IoT.

Thank you.