Software Engineering
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Thinking of Software in terms of Components

Sridhar Iyer: We are all familiar with buying things on an online platform like Amazon. We are familiar with ordering things online and we are not surprised when the goods land up at our doorstep. Behind it there is a huge system which actually makes this happen. So there is the vendor who is putting the things into the system, there is a logistics person who is trying to handle, ensure that the item reaches you in a timely manner and so on. Now how do you think this amazon system was built? Do you think it was built in one monolithic way?

Prajish Prasad: So in most cases software is not built as a monolithic system, but it is built incrementally, one feature after the other. And moreover, often times we do not know at the start what all features are required to be implemented.

Sridhar Iyer: Yes, that is a good point. So we incrementally build certain features into the application and the one, the people who built Amazon would have also done the same thing. And even for building these features software teams have to ensure that they are divided into manageable components.

So components are a way of breaking the complexity of a system into manageable parts, so that different teams can work on different components of the system and put everything together in a timely manner. Also everyone need not know the workings of all the components. As long as I know that if I ask some response from a component and I know what sort of response it will give me that is sufficient for me to proceed with my work.

So the components can hide the complexity of the implementation and provide an interface to others who want to know what the component does.

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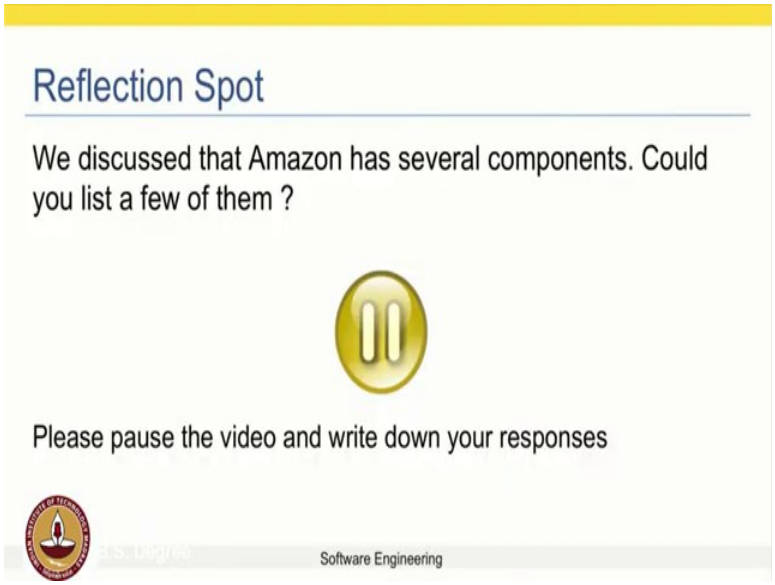

Now let us think about the components in the Amazon system. What do you think are some of the components? You can take a minute, pause here, think about what could the components in the Amazon system be if you were the, one of the developers of that system.

Prajish Prasad: So I think one major component in the Amazon system is, of course, their inventory management system. So they keep track of their inventory in such an intelligent way. So learners, you might be wondering what do we actually mean by intelligent, so let us think about what inventory management is. So inventory management is the act of measuring the amount, location, pricing, the mix of products available on Amazon.

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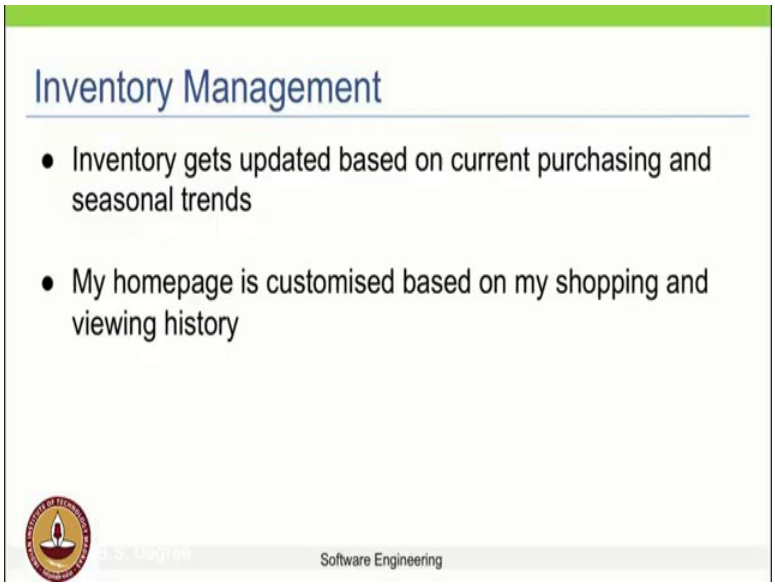

So when we go to the Amazon homepage we see that our inventory gets updated based on the current purchasing and seasonal trends and fluctuating customer demand and logistics and analytics also play a large part in inventory management. So it is very interesting to see how my Amazon homepage could be very different from yours.

The reason being Amazon customizes my home page based on my shopping and viewing history. Another component can be their payment gateway. So the payment gateway is another component, which offers ease of payment for both buyer and the seller.

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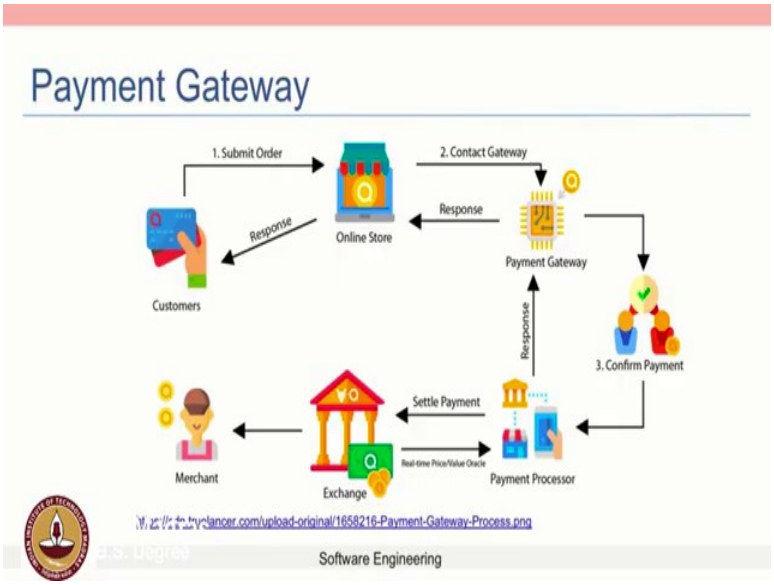

So payment gateway is a service that authorizes the electronic payments like online banking, debit cards, cash cards, etc. So the payment gateway acts as a middleman between the bank and the merchant's website or application. When a user wishes to make a payment the Amazon website sends the encrypted card information to the payment gateway. Then the payment gateway confirms the validity of these details with the bank and the required amount of money gets transferred from the user's account to the Amazon account.

Sridhar Iyer: So we looked at two components of the Amazon system - the inventory management and the payment gateway. I am sure you can think of more components that makes up such a system. So in this video we looked at components of a large system such as Amazon and we looked a little more closely at two components, the inventory management and the payment gateway.

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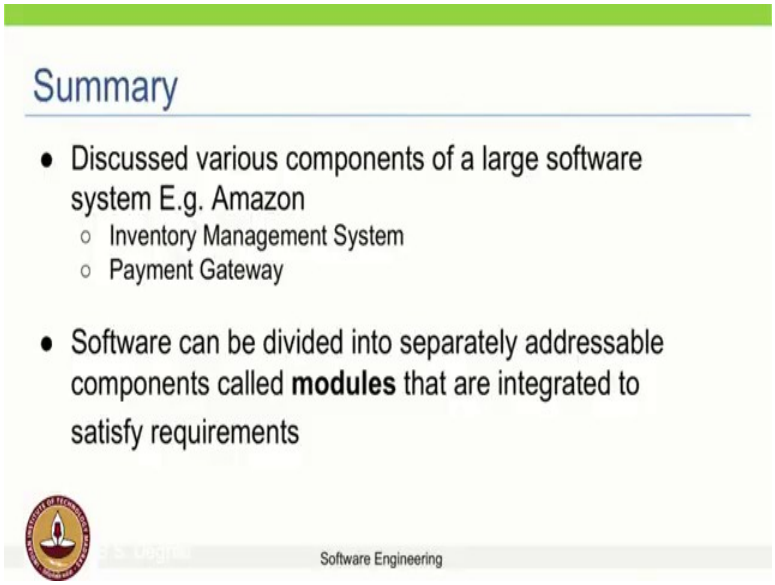

The main thing that we have learnt is that nobody builds a system all at once for the entire functionality of the system. So a system, a large system is broken down into components and there are different teams that work on those different components. Each of these components now is called a module and they can be developed separately and integrated together later. Of course, there is a lot of complexity in doing so, because you need these modules to be able to talk to each other and so on and that we will see in the following videos.