e-Business Systems

(Unit – 3)

by

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Electronic Payment System (EPS)

- EPS comprises payment services over the network. **An EPS consists of the following components**:
  - Buyer (Cardholder) - Any individual who is making online payment.
  - Merchant Account - A specific type of bank account required for a business to accept payments (from different payment modes) from customers.
  - Issuer (Issuing Bank) - Any bank that issues a debit or credit card to their customers.
  - Card Network (Card Association) – Group of member financial institutions that process card payments based on an agreed set of rules. Major examples are Rupay, Visa and MasterCard.
  - Acquirer (Acquiring Bank or Merchant Bank) – Any bank that processes a transaction based on information from the issuer and card association.
  - Payment Processor – A facility of an acquirer which transfers transaction details to the relevant network.
  - Payment Gateway – A software that facilitates the transfer of a customer's card details from a merchant's website to a payment processor.

Merchant Account

- A merchant account refers to a special types of bank account used by the businesses to accept payment from their customers.

- The merchant accounts have following characteristics:
  - Not the same as a regular business bank account.
  - Money can not be deposited into, or withdrawn from, by the business whose name the account is.
  - Accept payments electronically, holding the funds typically for a few days before transferring them to the business' regular bank account.

- By holding the funds for a short period, merchant accounts help reduce fraud:
  - The merchant doesn't want to give the money back.
  - The merchant is a fraud.

Payment Service Provider

- The payment service providers – also known as merchant service providers or PSPs – are third parties that help merchants to accept payments.

- PSPs provide both a merchant account (of their own or have relationships with banks that enable them to help businesses open a merchant account with a bank) and a payment gateway, ensuring that businesses can collect and manage their payments in a simple and efficient way.

- Some of the best-known PSPs in India include:

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• PayPal India	• PayU Money	• Payseal (by ICICI)
• Paytm	• CCAvenue	• EPI (by HDFC)
• Razorpay	• Instamojo	• Billdesk
• Cashfree	• EBS	• Atom Tech

Payment Gateway

- A payment gateway is a software that securely validates customer's card details, ensuring funds are available to get paid.

- The payment gateway offers the services that authorize card payments for businesses.

  - It facilitates the transfer of a customer's card details from a merchant's website **to** a payment processor.

  - The payment gateway tells the merchant whether the charge has been approved by the cardholder's bank and submits charges for settlement.

3D Secure

- 3D Secure (3-domain structure), also known as a payer authentication, is a security protocol that helps to prevent fraud in online credit and debit card transactions.

- This additional security was initiated and created by Visa and MasterCard and it's branded as 'Verified by Visa' and 'MasterCard SecureCode' respectively.

- The payer authentication is a three-part process, so there are three parties involved in the process:

  - Issuer (such as Visa or MasterCard)
  - Acquirer (Merchant and the Bank to which money is being paid)
 - Interoperability Domain (Payment System)

3D Secure: Example of a 3D Secure Page
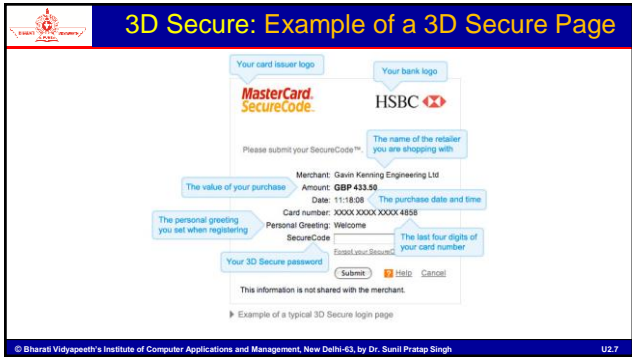
Working of 3D Secure

• When the customer uses the card that is enrolled in the 3D Secure program, the process looks as follows:

1. The customer enters his/her credit or debit card information in the payment form.

2. SecurionPay contacts a directory server and gets the message that the card is registered in the program.

3. The customer sees the 3D Secure page where they need to authenticate themselves to the issuing bank by entering the password or a one time PIN.

4. The result of the 3D Secure authentication goes to SecurionPay and then the transaction details are submitted to the acquiring bank.

5. The transaction is authorized by the acquirer.

6. The customer can see the response about whether the transaction is successful or failed.

Working of 3D Secure
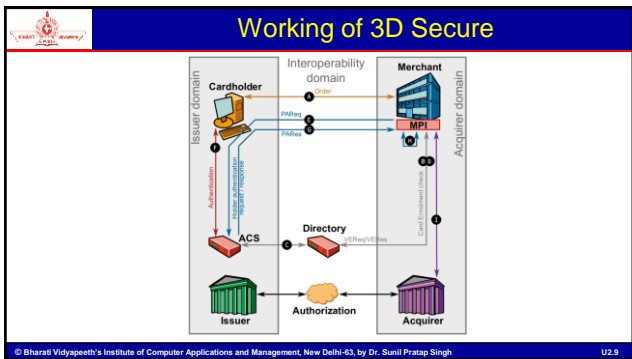
PCI Compliance in Payment Solutions

- The payment compliance refers to a protocol that all companies must stick to while developing new payment portals.

- The Payment Card Industry Data Security Standard (PCI DSS) is the set of rules that makes sure that every transaction is safe and no data is lost.

- The PCI DSS has set up 12 rules (categorized into 6 objectives) for compliance:

  1. Build secure network and systems and maintain it as well.
  2. Protect the data of the cardholder.
  3. Create a vulnerability management program.
  4. Implement strong access control measures.
  5. Monitor and test networks on a regular basis.
  6. Maintain an information security policy.

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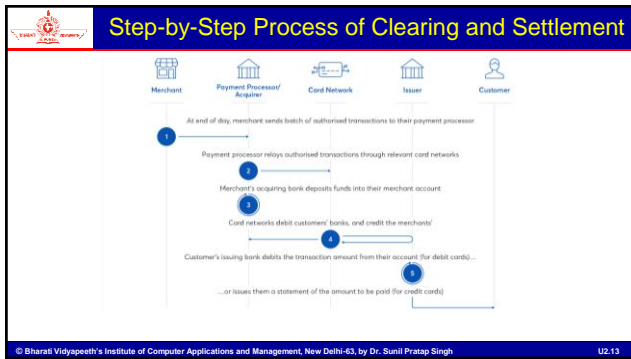
Working of Online Payments via Credit or Debit Card

- The overall process for card transactions takes place in two broad stages:

  - Authorization - An authorization, provided by the customer's card issuing bank, confirms the cardholder's ability to pay, ensuring that the customer's card/account is in good standing with sufficient funds to complete the purchase.

    - While making a payment transaction online, we will generally not get to know when this stage is happening since this happens in the background without any interaction from the customer. However, during an transaction on a Card Swipe Machine, we may see a glimpse of this stage after entering the PIN – the screen briefly shows the text "**Authorising**…".

  - Clearing and Settlement - It facilitates carrying out of actual inter-bank transactions. In settlement process, transactions with authorization codes are sent to the payment processor for payment to the merchant.
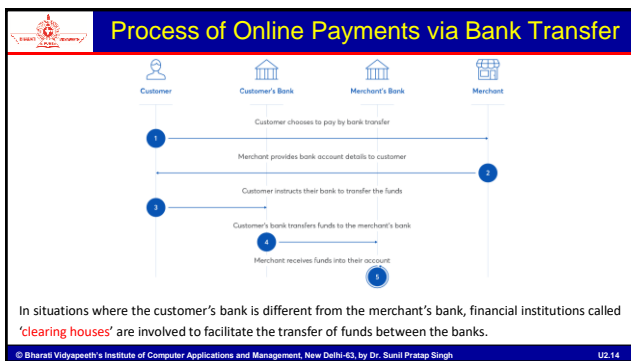

Note: Before authorization, authentication process is performed to confirm a cardholder's identity. This stage verifies whether the card number is correct or not as well as if the customer making the transaction is genuine or not. This stage only verifies the identity and doesn't check a customer's account balance nor does any kind of fund transfer.

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Step-by-Step Process of Authorization

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Step-by-Step Process of Clearing and Settlement

Process of Online Payments via Bank Transfer

In situations where the customer's bank is different from the merchant's bank, financial institutions called 'clearing houses' are involved to facilitate the transfer of funds between the banks.
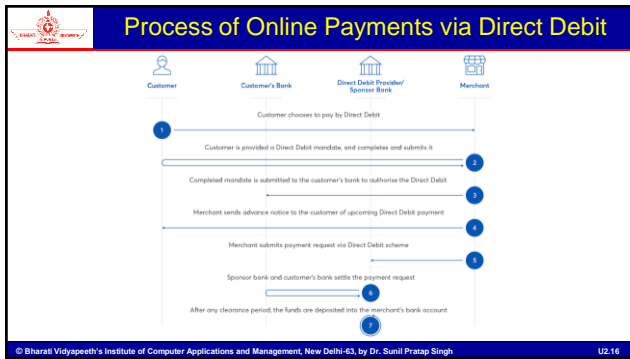
Online Payments via Direct Debit

- Direct debit is a payment method which allows businesses to collect funds owed by their customers, without the customer (the payer) needing to initiate the payment.
- This kind of mechanism is referred to as a pull-based payment method.

Process of Online Payments via Direct Debit

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Online Payments via Digital Wallet

- The digital wallets may act as either (or both):
  - A storage mechanism for payment details (e.g. credit or debit card details, bank details)
  - A storage mechanism for actual funds

- Paying using stored Payment Details:
  - If a customer makes a purchase using a digital wallet that only store the payment details for credit or debit card, the process is identical to a standard card payment. The only difference is that the digital wallet provider may be providing the merchant the facilities of a payment service provider.
  - If the digital wallet is storing bank details, they could effectively set up a standard direct debit mandate.

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Online Payments via Digital Wallet (contd…)

- Paying using stored Funds:
  - When a customer wishes to make a purchase using the funds stored in the digital wallet, the merchant must typically receive them into their own digital wallet from the same provider.
  - The digital wallet provider simply applies a virtual debit to the customer's wallet and the relevant credit to the merchant's wallet.
  - If a merchant wants to transfer these funds from their digital wallet to their bank account, the process would be almost identical to a standard bank transfer, with the digital wallet provider transferring the requested amount to the merchant's nominated bank account.

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Electronic Fund Transfer (EFT)

- Electronic fund transfer is used to move money from one account to another.

- The transaction is completed electronically, and the two accounts can be at the same financial institution or different financial institutions.

- The term "EFT" does not refer to a specific type of payment. It is actually an umbrella term that covers a broad range of electronic payments.

- EFT payments are processed by the bank through the Automated Clearing House (ACH) network, the transfer system that connects all the financial institutions, banks, and credit unions.

- In general, the ACH network processes EFTs in batches, which means that transactions are accrued throughout the day and processed later.

Important Types of EFT Payments

- Direct Deposit
  - A type of electronic transfer that allows the employer to pay employees electronically.
  - The employer can let his direct deposit service provider know how much to deposit in each employee's account, and then on payday, the money will be deposited.

- ATMs (Automated Teller Machines)
  - ATM allows us to transfer funds without entering the bank and talking to a teller.

- Credit/Debit Cards
  - We can make EFT payments with a credit or debit card. We can use our card to move money from a business bank account, make purchases, or pay bills.

Important Types of EFT Payments (contd…)

- National Electronic Funds Transfer (NEFT)
  - The National Electronic Fund Transfer or NEFT is the simplest and most liked form of money transfer from one bank to bank.
  - The funds are transferred on a deferred settlement basis, which implies that the money is transferred in batches. There is no maximum limit but this depends from one bank to another.
  - To make any NEFT transaction, you just need two important pieces of information -- firstly, account number and secondly, the IFSC Code of the destination account.
  - For transferring money to a different bank, Rs 2.50 to Rs 25 can be charged, based on the amount being transferred.

Important Types of EFT Payments (contd…)

- Real Time Gross Settlement (RTGS)
  - There is no maximum transfer limit, but the minimum is Rs. 2 lakhs.
  - The transactions are processed throughout the RTGS business hours.
  - Usually, the amount is remitted within 30-minutes.
  - It costs a little more than NEFT. But, it will not cost more than Rs. 30 for transactions up to Rs. 5 lakhs.
  - The fee varies from one bank to another.

Important Types of EFT Payments (contd…)

- Immediate Payment Service (IMPS)
  - For instant payments, we can send money through IMPS.

- Unified Payments Interface (UPI)
  - UPI-enabled apps allow us to make transactions (up to Rs 1 lakh) with any smartphone using a Virtual Payment Address (a unique ID created by the user to send or receive money through UPI).

Comparison of NEFT, RTGS and IMPS

BASIS OF COMPARISON	NEFT	RTGS	IMPS
Minimum transfer value	Re. 1	Rs. 2 lakh	Re. 1
Payment options	Online and offline	Online and offline	Online
Maximum transfer value	No limit	No limit	Rs.2 lakh
Settlement type	Half hourly basis	Real time	Real time
Inward transaction charges	No charges	No charges	Decided by the individual member banks and PPIs

Infrastructure Issues in EFT

- Electronic payments communication infrastructure includes computer network such as the internet and mobile network used for mobile phone. In developing countries, many of the rural areas are unbanned and lack of access to critical infrastructure that drives electronic payments.

- Poor communication infrastructure & Internet and mobile networking' is one of the reasons that hinder the e-payment system.

- Some of the debit cards technologies like automated teller machines (ATM) are still seen by many as unreliable for financial transactions.

- Telecommunication and electricity are not available throughout the country, which negatively affect the development of e-payments.

- etc.

Electronic Data Interchange

- Electronic data interchange (EDI) occurs when one business transmits computer-readable data in a standard format to another business.

- In the 1960s, businesses realized that many of the documents they exchanged were related to the shipping of goods; for example, invoices, purchase orders, and bills of lading.

- These documents included the same set of information for almost every transaction.

- By creating a set of standard formats for transmitting the information electronically, businesses were able to reduce errors, avoid printing and mailing costs, and eliminate the need to re-enter the data.

- Businesses that engage in EDI with each other are called trading partners.

- The standard formats used in EDI contain the same information that businesses have always included in their standard paper invoices, purchase orders, shipping documents, etc
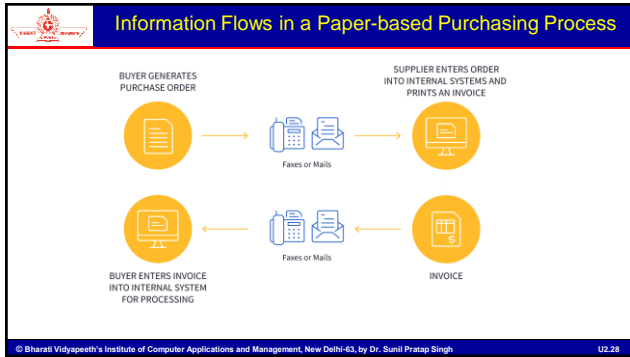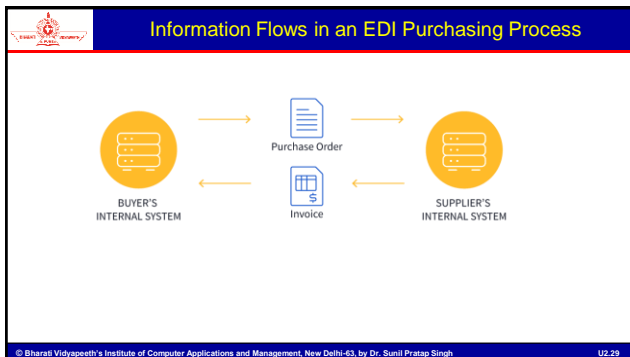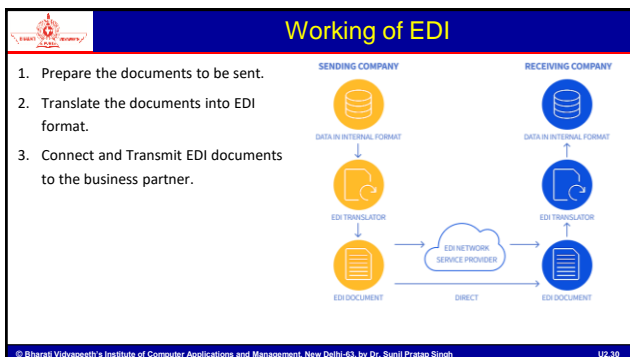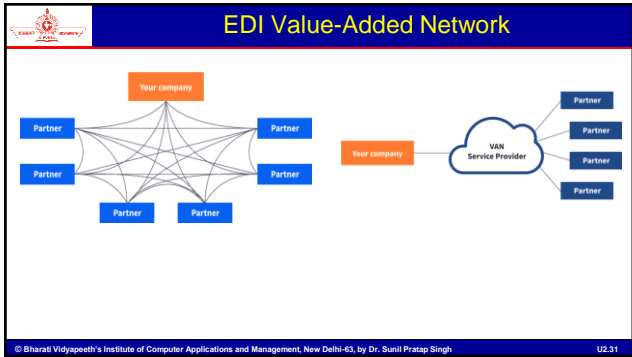
Electronic Data Interchange (contd…)

- Firms that exchange data in specific standard formats are said to be EDI compatible.

- The business information exchanged is often transaction data; however, it can also include other information related to transactions, such as price quotes and order status inquiries.

- Transaction data in B2B transactions includes the information traditionally included on paper documents.

- The data from invoices, purchase orders, requests for quotations, bills of lading, and receiving reports accounts for more than 75 percent of all information exchanged by trading partners.

- EDI was the first form of electronic commerce to be widely used in business—beginning some 20 years before anyone used the term electronic commerce—and it continues to be an important part of B2B.

Information Flows in a Paper-based Purchasing Process

Information Flows in an EDI Purchasing Process

Working of EDI

1. Prepare the documents to be sent.
2. Translate the documents into EDI format.
3. Connect and Transmit EDI documents to the business partner.

EDI Value-Added Network

EDI Value-Added Network
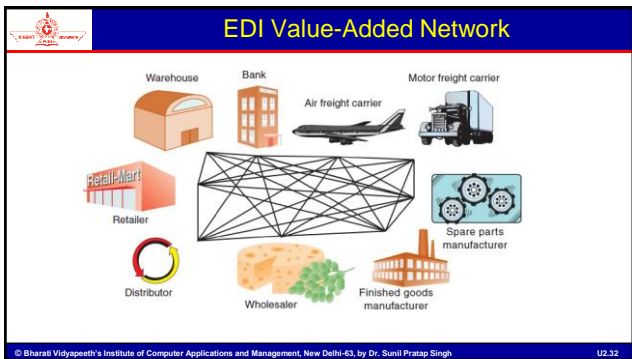
What Comprises an EDI Document?

EDI Envelopes

- EDI document transmission uses a system of three "envelopes" to house your transaction sets – Message envelope, Group envelope and Interchange envelope.

  - Each transaction set is placed in its individual envelope.

  - A group of transaction sets – e.g., a group of purchase orders – is placed in a group envelope.

  - All group envelopes being sent from one sender to one receiver are placed in an Interchange envelope.

EDI Envelopes

Types of EDI: Direct EDI

Types of EDI: EDI Via VAN

Benefits of EDI

- EDI technology saves time and money through automation of a process previously manually executed with paper documents.

- EDI solutions improve efficiency and productivity because more business documents are shared and processed in less time with greater accuracy.

- EDI data transfer reduces errors through rigid standardization, which helps to ensure information and data are correctly formatted before they enter business processes or applications.

- EDI integration improves traceability and reporting because electronic documents can be integrated with a range of IT systems to support data collection, visibility and analysis.

- EDI automation supports positive customer experiences by enabling efficient transaction execution and prompt, reliable product and service delivery.

Bibliography

- Gary P. Schneider and James T. Perry, "Electronic Commerce", Thomson Learning, 1st Edition, 2000.