

## Introduction

- An e-commerce payment system facilitates the acceptance of electronic payment for online transactions.
- E-commerce payment systems have become increasingly popular due to the widespread use of the internet-based shopping and banking.
- Over the years, credit cards have become one of the most common forms of payment for e-commerce transactions. In North America almost 90% of online B2C transactions were made with this payment type.
- E payment is a subset of an e-commerce transaction to include electronic payment for buying and selling goods or services offered through the Internet.
- Electronic payment system is a system which helps the customer or user to make online payment for their shopping.

## Requirements for E-payments

- The various factors that have lead the financial institutions to make use of electronic payments are:
  - Decreasing technology cost
  - Reduced operational and processing cost
  - Using online payment we save both paper and time.

## Methods of Online Payment

1. Credit card.
2. Debit card.
3. Smart card.
4. Net Banking.(Electronic fund transfer)
5. Electronic Wallet.
6. Electronic cash.
7. Micropayment.

## Credit card

- A credit card is a payment card issued to users as a system of payment. It allows the cardholder to pay for goods and services based on the holder's promise to pay for them.
- The issuer of the card creates a revolving account and grants a line of credit to the consumer (or the user) from which the user can borrow money for payment to a merchant or as a cash advance to the user.
- A credit card is a card that allows you to borrow money in small amounts at local merchants.
- You use the card to make your basic transactions.
- If you don't pay the amount owing on your credit card in full by the payment due date, your card company will charge you interest according to the type of transactions you have made.
- Electronic verification systems allow merchants to verify in a few seconds that the card is valid and the cardholder has sufficient credit to cover the purchase, allowing the verification to happen at time of purchase.
- The verification is performed using a credit card payment terminal or point-of-sale (POS) system with a communications link to the merchant's acquiring bank. Data from the card is obtained from a magnetic stripe or chip on the card.
- When a customer purchases a product via credit card, credit card issuer bank pays on behalf of the customer and customer has a certain time period after which he/she can pay the credit card bill. It is usually credit card monthly payment cycle.
- Following are the actors in the credit card system
  - **The card holder - Customer**
  - **The merchant - Seller of product who can accept credit card payments.**
  - **The card issuer bank - card holder's bank**
  - **The acquirer bank - the merchant's bank**
  - **The card brand - for example, visa or mastercard.**

### **Debit Card.**

- A debit card is a plastic payment card that provides the cardholder electronic access to his or her bank account(s) at a financial institution.
- Debit cards usually also allow for instant withdrawal of cash, acting as the ATM card for withdrawing cash.
- The major difference between debit card and credit card is that in case of payment through debit card, amount gets deducted from card's bank account immediately and there should be sufficient balance in bank account for the transaction to get completed whereas in case of credit card there is no such compulsion.
- Online debit cards require electronic authorization of every transaction and the debits are reflected in the user's account immediately. The transaction may be additionally secured with the personal identification number (PIN) authentication system.
- The debit card had limited popularity in India as the merchant was charged for each transaction. The debit card was mostly used for ATM transactions.
- Most Indian banks issue Visa debit cards, though some banks (like SBI and Citibank India) also issue Maestro cards.
- The debit card transactions are routed through Visa or MasterCard networks in India.

## Smart Card

- A smart card, chip card, or integrated circuit card (ICC) is any pocket-sized card with embedded integrated circuits.
- Smart Cards with a microprocessor look like standard plastic cards but are equipped with embedded circuit IC chip. Microprocessor cards can store information, carry out local processing on the data stored, and perform complex calculations.
- Smart cards are secure as they stores information in encrypted format and are less expensive and provide faster processing.
- There are two types of microprocessor cards.
- **1. Contact-less smart card**
- **2. Contact smart card**
- **Contactless smart card** - Contactless smart cards do not require physical contact between a card and reader.
- They are becoming more popular for payment and ticketing. Typical uses include mass transit and motorway tolls.
- Contactless smart card, in which the card communicates with and is powered by the reader through RF induction technology.
- **Contact smart card-** Contact smart cards have a contact area of approximately 1 square centimeter, comprising several gold-plated contact pads.
- These pads provide electrical connectivity when inserted into a reader, which is used as a communications medium between the smart card and a host (e.g., a computer, a point of sale terminal) or a mobile telephone.

### **Application of Smart card**

- Banking/payment
- Identification
- Ticketing
- Parking and toll collection
- Universities use smart cards for ID purposes and at the library, vending machines, copy machines, and other services on campus.
- SIM cards used on cell phones contain mobile phone security, subscription information, phone number on the network, billing information, and frequently called numbers.

### **Advantage of Smart Card**

- Life of a smart card is longer.
- A single smart card can be used for multiple applications. Just one card can be used as your license, passport, credit card, ATM card, ID Card, etc.
- Smart cards cannot be easily replicated and are, as a general rule much more secure than magnetic stripe cards
- Capable of processing, not just storing information Smart cards can communicate with computing devices through a smart card reader. Information and applications on a card can be updated without having to issue new cards
- A smart card carries more information than can be accommodated on a magnetic stripe card. It can make a decision, as it has relatively powerful processing capabilities that allow it to do more than a magnetic stripe card (e.g., data encryption).

## **Electronic Fund Transfer (EFT)**

- Electronic funds transfer (EFT) is the electronic exchange, transfer of money from one account to another, either within a single financial institution or across multiple institutions, through computer-based systems.
- Electronic fund transfer is a transaction that takes place over computerized network, either among account at the same bank or to different account at separate financial institution.

EFT covers a number of different concepts:-

- Cardholder-initiated transactions, using a payment card such as a credit or debit card.
- Direct deposit payment initiated by the payer.
- Direct debit payments, sometimes called electronic checks, for which a business debits the consumer's bank accounts for payment for goods or services.
- Electronic bill payment in online banking, which may be delivered by EFT

### **Direct Deposit in EFT:-**

- Direct deposit, also known as direct credit, is a banking term that describes a deposit of money by a payer directly into a payee's bank account.
- Direct deposits are most commonly made by businesses in the payment of salaries and wages and for the payment of suppliers' accounts, but the facility can be used for payments for any purpose.
- Direct deposits are most commonly made by means of electronic funds transfers effected using online banking systems.
- When making a direct deposit by means of electronic funds transfer, the payer would also enter reference information to enable the payee to easily recognize who made the deposit and which account to credit. The reference may be an account number, an invoice number, the payer's name or some other meaningful identification.

### **Direct debit in EFT:-**

- A direct debit or direct withdrawal is a financial transaction in which one person withdraws funds from another person's bank account.
- Formally, the person who directly draws the funds ("the payee") instructs his or her bank to collect (i.e., debit) an amount directly from another's ("the payer's") bank account designated by the payer and pay those funds into a bank account designated by the payee.
- Before the payer's banker will allow the transaction to take place, the payer must have advised the bank that he or she has authorized the payee to directly draw the funds.
- It is also called pre-authorized debit (PAD) or pre-authorized payment (PAP).
- Direct debits are typically used for recurring payments, such as credit card and utility bills, where the payment amounts vary from one payment to another.

### **Automated Clearing House (ACH)**

- Automated Clearing House (ACH) is an electronic network for financial transactions in the United States.
- ACH processes large volumes of credit and debit transactions in batches.
- ACH credit transfers include direct deposit payroll and vendor payments.
- ACH direct debit transfers include consumer payments on insurance premiums, mortgage loans, and other kinds of bills.

### **Application of Electronic fund transfer**

- Business-to-business payments.
- Direct debit payment of consumer bills such as mortgages, loans, utilities, insurance premiums, rents, and any other regular payment.
- Direct deposit of payroll, Social Security and other government payments, and tax refunds.
- E-commerce payments.
- Federal, state, and local tax payments.

## **Electronic Check**

- An e-Check can also be called an electronic check, direct debit, ACH payment, or ACH transfer.
- It is the means by which you can take the information typically contained on a paper check and process the payment electronically using the ACH network.
- Electronic check processing is the means by which you can take a customer's routing and account number (the numbers imprinted at the bottom of a paper check) and submit it for payment electronically, typically using an online interface, instead of accepting a paper check and taking it to the bank.
- It use digital signature for signing and require the use of digital certificate to authenticate the payer.
- The payer writes the e-check through a computer uses a digital signature and send it to payee using internet.
- The check is then sent over internet to the payee's bank for deposit. Bank verify digital signature, then clear and settle the e-check by sending it on the payer's bank.
- The amount of e-check is debited from payer's account and credited to payee's account.



## Payment Gateway

- A **payment gateway** is an e-commerce application service provider service that authorizes credit card payments for e-businesses, online retailers, bricks and clicks, or traditional brick and mortar.<sup>[1]</sup>
- It is the equivalent of a physical point of sale terminal located in most retail outlets. Payment gateways protect credit card details by encrypting sensitive information, such as credit card numbers, to ensure that information is passed securely between the customer and the merchant and also between merchant and the payment processor.
- A payment gateway facilitates the transfer of information between a payment portal (such as a website, mobile phone or interactive voice response service) and the Front End Processor or acquiring bank.

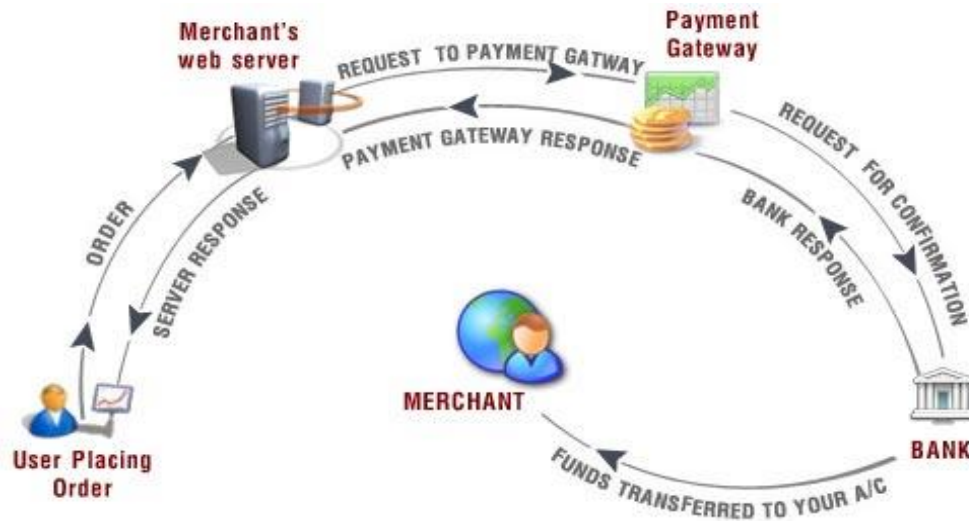
### Transaction process in payment gateway

- A customer places order on website by pressing the 'Submit Order' or equivalent button.
- If the order is via a website, the customer's web browser encrypts the information to be sent between the browser and the merchant's webserver. In between other methods, this may be done via SSL (Secure Socket Layer) encryption.
- The merchant then forwards the transaction details to their payment gateway. This is another (SSL) encrypted connection to the payment server hosted by the payment gateway.
- The payment gateway forwards the transaction information to the payment processor used by the merchant's acquiring bank.
- The payment processor forwards the transaction information to the card association (e.g., Visa/MasterCard/American Express) the card association routes the transaction to the correct card issuing bank.
- The credit card issuing bank receives the authorization request and does fraud and credit or debit checks and then sends a response back to the processor (via the same process as the request for authorization) with a response code [e.g.: approved, denied].
- The processor forwards the authorization response to the payment gateway.
- The payment gateway receives the response, and forwards it on to the website.
- The entire process typically takes 2–3 seconds.<sup>[4]</sup>
- The merchant then fulfills the order and the above process is repeated but this time to "Clear" the authorization by consummating the transaction. Typically the "Clear" is initiated only after the merchant has fulfilled the transaction (e.g.: shipped the order).
- The merchant submits all their approved authorizations, in a "batch" (e.g.: end of day), to their acquiring bank for settlement via its processor.
- The acquiring bank makes the batch settlement request of the credit card issuer.
- The credit card issuer makes a settlement payment to the acquiring bank (e.g.: the next day)
- The acquiring bank subsequently deposits the total of the approved funds into the merchant's nominated account (e.g.: the day after). This could be an account with the

## Unit 2:- Payment system in E-Commerce.

acquiring bank if the merchant does their banking with the same bank, or an account with another bank.

- The entire process from authorization to settlement to funding typically takes 3 days.



### Payment Gateway Example:-

1. Authorize.net
2. PayPal Express Checkout
3. 2Checkout

## Micropayment

- A micropayment is a financial transaction involving a very small sum of money and usually one that occurs online.
- PayPal defines a micropayment as a transaction of less than 12 USD<sup>[1]</sup>.
- A micropayment is an e-commerce transaction involving a very small sum of money in exchange for something made available online, such as an application download, a service or Web-based content.
- Micro-payments are online transactions of low value, ranging from several pennies to approximately \$10.00. Micro-payments are commonly used to pay for downloads of newspaper articles, electronic books, music clips, or software, but could be used for virtually any low-priced item for sale on the Internet
- Because the cost of accepting credit cards for small purchases is prohibitively expensive, some companies involved in e-commerce have turned to third party vendors to manage the billing and collection of micro-payments. Such vendors normally receive a percentage of each transaction as compensation.
- Micropayments were initially devised as a way of allowing the sale of online content and as a way to pay for very low cost network services. They were envisioned to involve small fractions of a cent, as little as US\$0.0001 to a few cents. Micropayments would enable people to sell content on the Internet and would be an alternative to advertising revenue.

Example of Micropayments.

- **M-Coin** :- M-Coin allows users to make micropayments on the Internet. The user's phone bill is then charged by the mobile network operator.
- **PayPal**:- PayPal MicroPayments is a micropayment system that charges payments to user's PayPal account and allows transactions of less than US\$12 to take place. The service is, as of 2013, offered in select currencies only.
- **Zong**:-Zong mobile payments is a micropayment system that charges payments to users' mobile phone bills. This service can be used to purchase virtual goods in online games and social networking services.

### **Electronic Data Interchange (EDI)**

- Electronic Data Interchange (EDI) is the computer-to-computer exchange of business documents in a standard electronic format between business partners.
- Electronic data interchange (EDI) is an electronic communication system that provides standards for exchanging data via any electronic means.
- Computer-to-computer– EDI replaces postal mail, fax and email. While email is also an electronic approach, the documents exchanged via email must still be handled by people rather than computers. Having people involved slows down the processing of the documents and also introduces errors. Instead, EDI documents can flow straight through to the appropriate application on the receiver's computer (e.g., the Order Management System) and processing can begin immediately.
- Business documents – These are any of the documents that are typically exchanged between businesses. The most common documents exchanged via EDI are purchase orders, invoices and advance ship notices. But there are many, many others such as bill of lading, customs documents, inventory documents, shipping status documents and payment documents.
- Standard format– Because EDI documents must be processed by computers rather than humans, a standard format must be used so that the computer will be able to read and understand the documents.
- Business partners – The exchange of EDI documents is typically between two different companies, referred to as business partners or trading partners.
- There are 3 steps to sending EDI documents –
  1. Prepare the documents
  2. Translate the documents into EDI format
  3. Transmit the EDI documents to your partner

#### **Step 1: Prepare the documents to be sent**

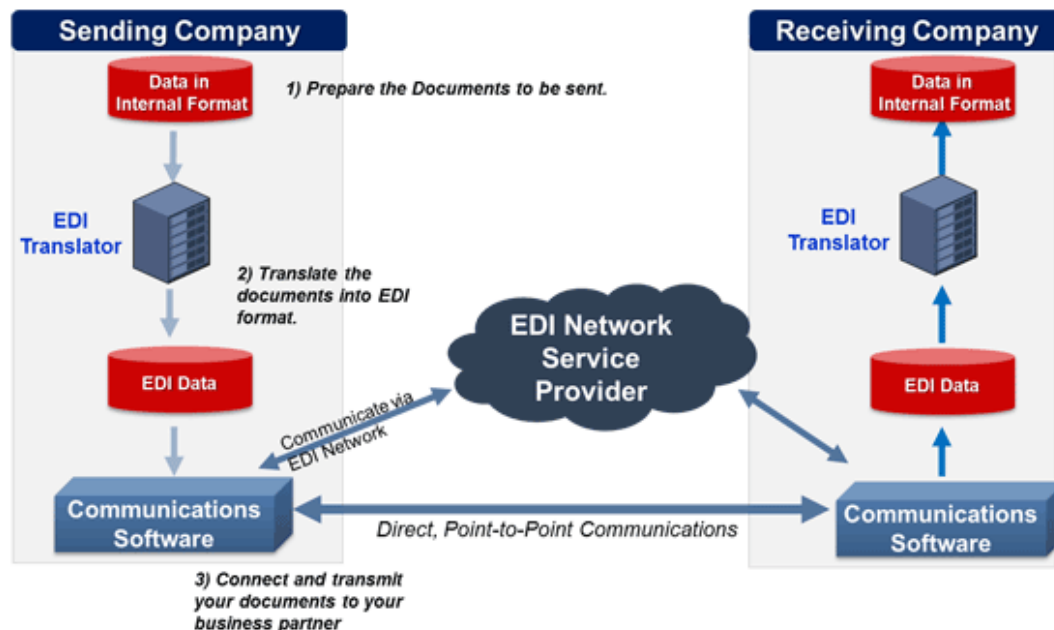
- The first step is to collect and organize the data. For example, instead of printing a purchase order, your system creates an electronic file with the necessary information to build an EDI document.

#### **Step 2: Translate the documents into EDI format**

- The next step is to feed your electronic data through translator software to convert your internal data format into the EDI standard format using the appropriate segments and data elements.

### Step 3: Connect and Transmit your EDI documents to your business partner

- Once your business documents are translated to the appropriate EDI format they are ready to be transmitted to your business partner. You must decide how you will connect to each of your partners to perform that transmission. There are several ways, the most common of which include 1) to connect directly using AS2 or another secure internet protocol,
- 2) connect to an EDI Network provider (also referred to as a VAN provider) using your preferred communications protocol and rely on the network provider to connect to your business partners using whatever communications protocol your partners prefer, or
- 3) a combination of both, depending on the particular partner and the volume of transactions you expect to exchange.



### EDI Standard Format

- The UN-recommended **UN/EDIFACT** is the only international standard and is predominant outside of North America.
- The US standard **ANSI ASC X12 (X12)** is predominant in North America.