Digital Finance

Payment Systems

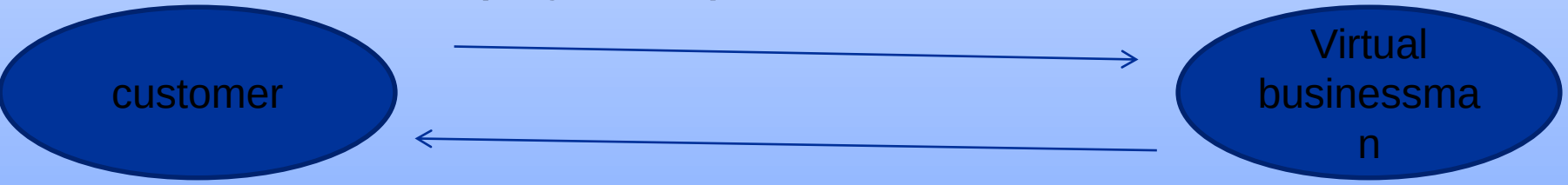
Lecture 8-9

Introduction

E payments are payments that are made electronically over the internet . Earlier almost all the business transactions were done through cash payments but now IT revolution has led to the development of new forms of payment

Electronic payment system

payment(EFT , e-cash ,e check , e-wallet,micropayment)



product or service

1. *Electronic payment system is a financial exchange that takes place online between buyers and sellers*
2. *There are different methods to pay electronically like credit cards , electronic cash etc.*

Traditional payment scheme

- *Payment(credit card ,cash , check)*

- *Produce or service*

- *In earlier days ,conventional cash were most popular because they were the only payment type available*
- *However with time banks cane into existence and the society underwent a financial revolution.*
- *But all these modes of the conventional payment and settlement process act as a bottleneck in the fast moving electronic commerce environment*

Problems in traditional payment system

- *Lack of convenience*
- *Lack of security*
- *Lack of coverage*
- *Lack of eligibility*
- *Lack of support for mic*

TYPES OF E-PAYMENT SYSTEM

PAYMENT CARDS

- CREDIT CARDS
- DEBIT CARDS
- CHARGE CA
- SMART CARI

CREDIT CARDS

- Two of credit cards on the market.
- Credit cards issued by credit companies(e.g. Master card, visa) and major banks (SBI, HDFC etc.).
- Cre nental stor ies(e.g. She

DEBIT CARDS

- Plastic card with a unique number.
- Requires a bank account.
- No interest charges related to this card.

CHARGE CARDS

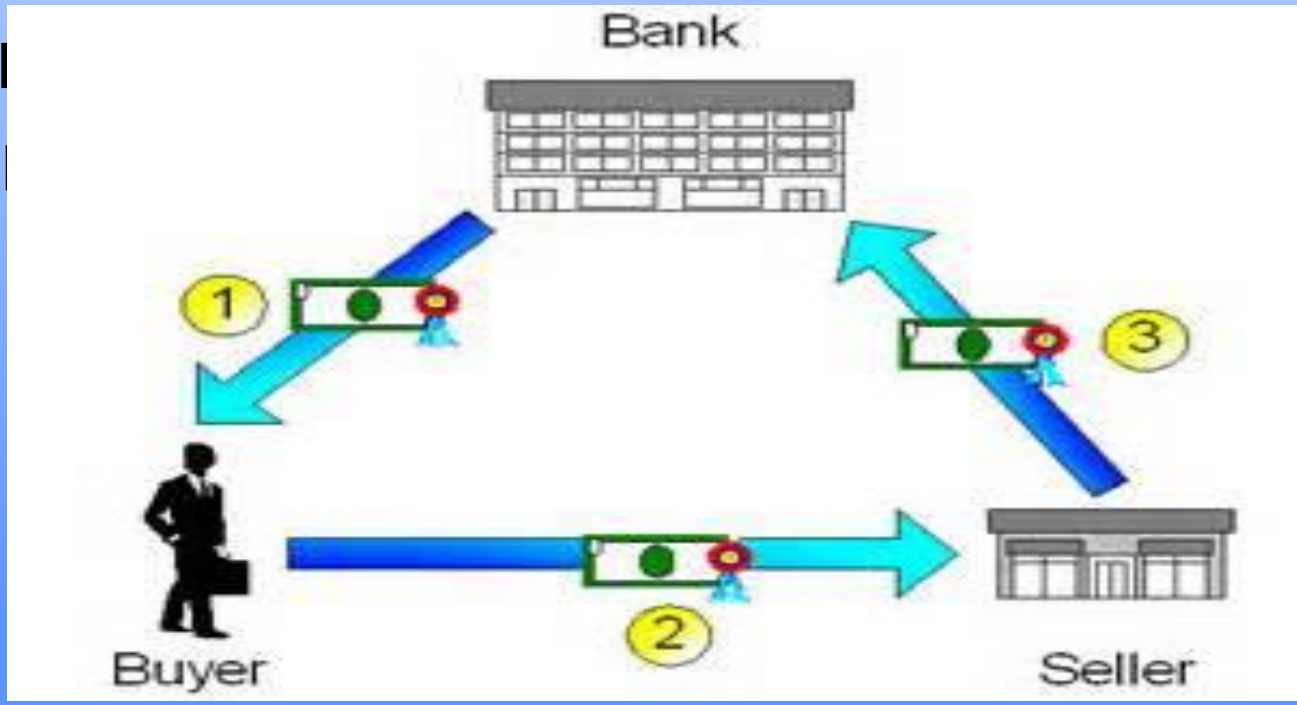
- Are similar to credit cards except they have no revolving credit line so they have make payments every month.

SMART CARDS

It similar to credit card and debit card in appearance bt it has a small microprocessor chip embedded in it.

ELECTRONIC CASH

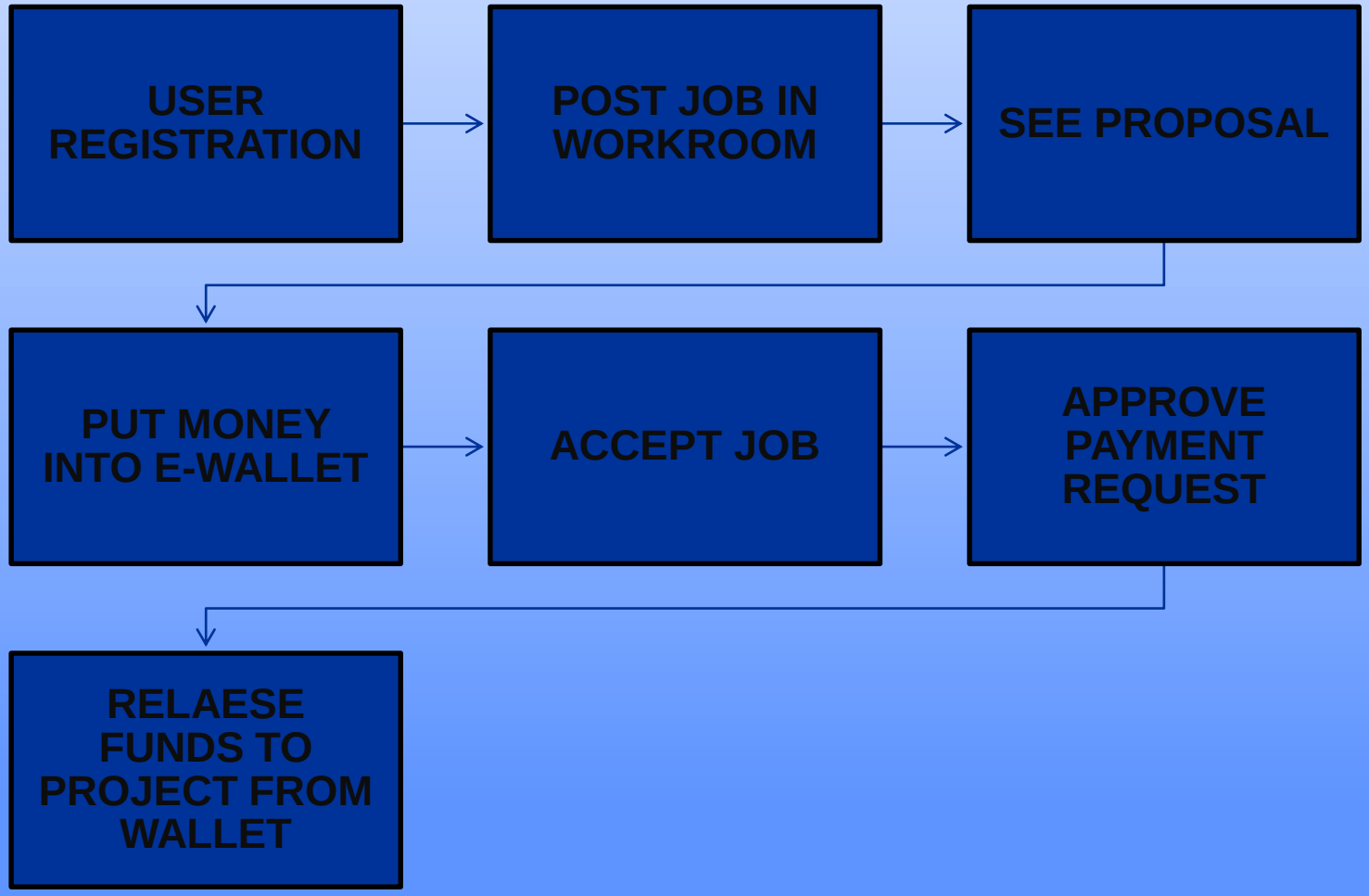
- In case of e-cash, both customer and merchant have to sign up with the bank or company issuing e-cash.
- Enables tra
without the



E-WALLETS

- E-wallet is a card with microchip.
- Replaces cash & coins for small ticket purchases like road/bridges tolls, pay phones.
- It is convenient & safe way to carry less cash.
- Example Microsoft Wallet.

How to access e-wallets



MICRO-PAYMENT SYSTEM

- small payments on web like billing by bank, financial institute etc.
- Universal acceptance
- comprehensive security.

PEER-2-PEER PAYMENTS

- Online financial transfer

  through e-mail address.
- Reduces risk of fraud & overdrawn a/c.
- Example **PayPal** services.

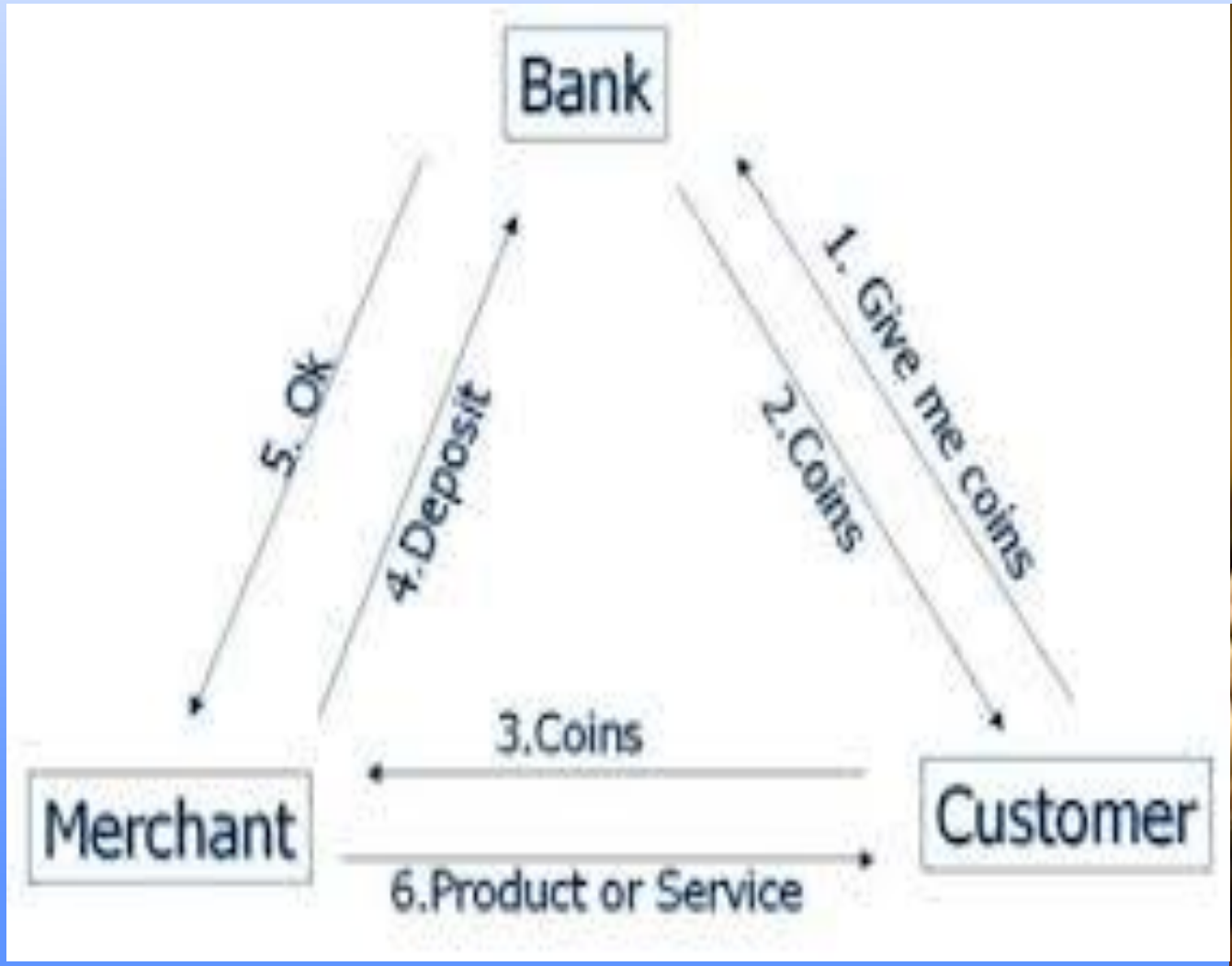
E-PAYPAL SYSTEM

- It enables the merchants or individuals to withdraw cash from their PayPal accounts.
- Allows customers to send their transaction money quickly & safe to anyone.
- To use it one should must get registered themselves .

E-CASH

- Online payments via debit cards, credit cards or smart card are the examples of e-money transactions.
- E Cash is transferred directly from customer's desktop to the merchant's site.

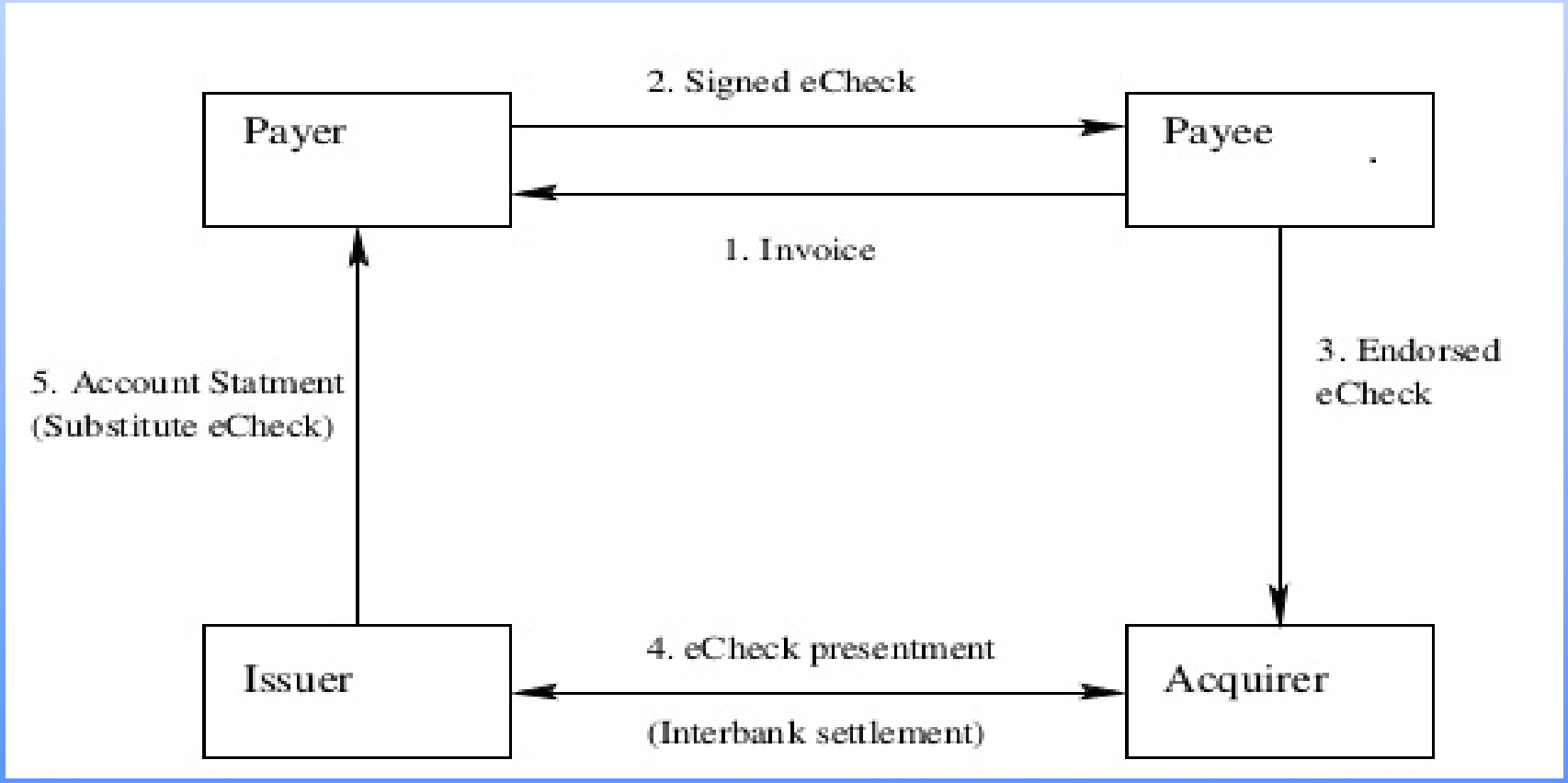
HOW TYPICAL E-CASH SYSTEM WORKS?



E-CHEQUE

- E-Cheque is the result of co-operation between several banks, government entities, technology companies and e-commerce organizations.
- These can be used for small and large

E-CHEQUE WORKING



ELECTRONIC FUND TRANSFER

- It is one of the oldest methods to transfer money.
- It is the groundwork of groundless and cheque-less culture, it is used to transfer money without any paper money changing hands.

Benefits of EFT

- Simplified accounting
- Improved efficiency
- Reduced administrative costs
- Improved security

ENTITIES

PAYER AND PAYEE

PAYER-A Payer is a person who makes the payment.

PAYEE- A Payee is a person who receives payment

FINANCIAL INSTITUTE AS ISSUER OR ACQUIRER

The financial institution participates in payment protocols in two roles- as an issuer and as an acquirer. The issuer holds payer s' account and acquirer holds payee s' account and assets. The payee deposits the payment received during a transaction with the acquirer.

Trustee or Arbiter

Other parties that may be present in a payment protocol include a Trustee who is an entity that is independent from all parties . Trustee is asked to adjudicate any disputes between payer and payee

PAYMENT GATEWAY

Payment Gateways are the entities that act as a medium for transaction processing between the entities (e.g. mastercard visa) and Certification authorities (CA) . They issue public key certificates to entities.

PHASES IN E-PAYMENT

REGISTRATION

- **The payee must register themselves with the site of online service providers.**
- **By filling a form and creating user ID.**
- **A Payee can access subscribed billing information and payments, simply by login his ID.**

Invoicing

In this phase, payee obtains an invoice for payment from the payor .

PAYMENT SELECTION AND PROCESSING

In this the payer selects type of payment (card based, e-cash,e-cheque) based on the type of payment payee accepts.

AUTHORISATION AND CONFIRMATION

In this, the acquirer on receiving payment details from the payee authorises the payment and issues a receipt containing the success or failure of payment.

ELECTRONIC PAYMENT SYSTEM

BENEFITS OF ELECTRONIC PAYMENT SYSTEM

- BENEFIT TO BUYERS
- BENEFITS TO SELLERS

BENEFITS TO BUYER

1. Convenience of global acceptance

- *Electronic payment methods provide a wide range of payment options and enhanced financial management tools through which individuals can pay for numerous different types of transactions ranging from parking payments to travel tickets pr payments in foreign currency.*

2. Universal acceptance

- *With electronic payment methods payments can be made over the phone, on the internet, and through the post and accepted everywhere.*

3. Greater security

- *Electronic payment system is safe and secure as it follows strict encrypted secure system for making payments keeping buyer's identity and details completely confidential and reduced liability for stolen or misused cards.*

4. Consumer protection

- *The electronic payment system provides additional insurance by facilitating disputes resolution in the case of unsatisfactory receipt of goods and services .*

4. Accessibility to immediate credit

- *E-payment system allow consumers to transfer funds, purchase stocks, and offer a variety of other services without having to handle physical cash. Using credit card it is very easy to make payments.*

6. Better control over payments

- *Electronic payment also provides the ability to control payment for goods and services over time by allowing buyers to pay at will whenever they want or have sufficient funds to make payments.*

BENEFITS TO SELLERS

1. Speed and security

- *EPS ensure faster processing of transaction from verification and authorization to clearing and settlement . It reduces the visibility of information.*

2. Reduces cost

- *EPS provides companies freedom from more costly labour, materials and accounting services hat are require in paper based processing.*

3. Efficiency

- *It leads to better management of cash flow, inventory and financial planning due to swift bank payment.*

4. Better control

- *When used properly the electronic aspects of purchasing and prepaid cards can increase internal controls over high volumes .*

TYPES OF TRANSACTIONS IN EPS

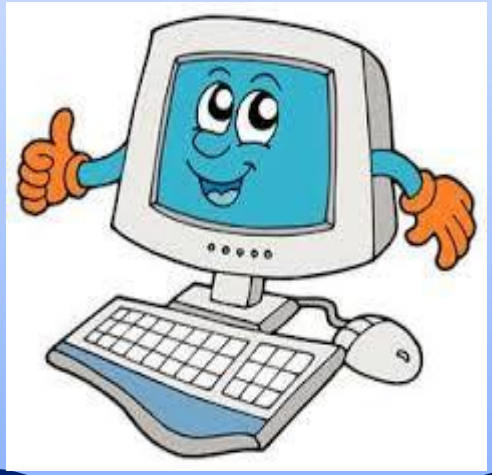
1. A ONE TIME CUSTOMER TO VENDOR PAYMENT	• ***It is used when you shop online at an e-commerce site, such as Amazon .***
2. RECURRING CUSTOMER TO VENDOR PAYMENT	• ***It is used when you pay a bill through a regularly scheduled direct debit from your checking account or an automatic charge to your credit card.***
3. AUTOMATIC BANK TO VENDOR PAYMENT	• ***In this, your bank offer a service called online bill pay.***

SECURITY ISSUES

1. Confidential

2. Integrity

3. Availability



4. Authenticity

5. Encryption

6. Audit ability

7. Non – Rejection

SECURE EPS INFRASTRUCTURE

- SECURE ELECTRONIC FUNDS TRANFER IS CRUCIAL TO E-COMM.IN ORDER TO ENSURE THE INTEGRITY AND SECURITY OF EACH ELECTRONIC TRANSACTION AND OTHER EPSS UTILIZE SOME OR ALL OF THE FOLLOWING SECURITY MEASURES AND TECHNOLOGIES DIRECTLY RELATED TO EPSS:AUTHENTICATION, PUBLICKEYCRYPTOGRAPHY, DIGITAL SIGNATURES, CERTIFICATE,SSL, S-HTTP.

AUTHENTICATION :

THIS IS THE PROCESS OF VERIFICATION OF THE AUTHENTICITY OF A PERSON AND OR A TRANSACTION. THERE ARE MANY TOOLS AVAILABLE TO CONFIRM THE AUTHENTICITY OF A USER. FOR INSTANCE, PASSWORDS AND ID NUMBERS ARE USED TO ALLOW A USER TO LOG ONTO A PARTICULAR SITE

PUBLIC KEY CRYPTOGRAPHY

- PUBLIC KEY CRYPTOGRAPHY USES TWO KEYS,ONE PUBLIC AND ONE PRIVATE,TO ENCRYPT AND DECRYPT DATA, RESPECTIVELY.CRYPTOGRAPHY IS THE PROCESS OF PROTECTING THE INTEGRITY AND ACCURACY OF INFORMATION BY ENCRYPTING DATA INTO AN UNREADABLE FORMAT, CALLED CIPHER TEXT. PUBLIC KEY CRYPTOGRAPHY USES A PAIR OF KEYS, ONE PRIVATE AND ONE PUBLIC. IN CONTRAST, PRIVATE KEY CRYPTOGRAPHY USES ONLY ONE KEY FOR ENCRYPTION . THE ADVANTAGE OF THE DUAL-KEY TECHNIQUE IS THAT IT ALLOWS THE BUSINESSES TO GIVE AWAY THEIR PUBLIC KEYTO ANY ONE WHO WANTS TO SEND A MESSAGE. THE PRIVATE KEY IS NOT PUBLICLY KNOWN.

DIGITAL SIGNATURE

- RATHER THAN AWRITTEN SIGNATURE THAT CAN BE USED BY AN INDIVIDUAL TO AUTHENTICATETHE IDENTITY OF THE SENDER OF A MESSAGE OR THE DOCUMENT;A DIGITAL SIGNATURE IS AN ELECTRONIC ONE. E-CHEQUE TECHNOLOGY ALSO ALLOWS DIGITAL SIGNATURE TO BE APPLIED TO DOCUMENTBLOCKS, RATHER THAN TO THE ENTIRE DOCUMENT. THIS LETS PART OF A DOCUMENT TO BE SEPARATED FROM THE ORIGINAL,WITHOUT COMPROMISING THE INTEGRITY OF THE DIGITAL SIGNATURE. THIS TECHNOLOGY WOULD ALSO BE VERY USEFUL FOR BUSINESS CONTRACTS AND OTHER LEGAL DOCUMENTS TRANSFERRED OVER THE WEB.

- THE FOLLOWING ARE SOME FUNCTION OF DIGITAL SIGNATURE;1 THE AUTHENTICATION FUNCTION: THE TERM DIGITAL SIGNATURE IN GENERAL IS RELEVANT TO THE PRACTICE OF ADDING A STRING OF CHARACTERS TO AN ELECTRONIC MESSAGE THAT SERVES TO IDENTIFY THE SENDER OR THE ORIGINATOR OF A MESSAGE.2THE SEAL FUNCTION: SOME DIGITAL SIGNATURE TECHNIQUES ALSO SERVE TO PROVIDE A CHECK AGAINST ANY ALTERATION OF THE TEXT OF THE MESSAGE AFTER THE DIGITAL SIGNATURE WAS APPENDED.3THE INTEGRITY FUNCTION: THE FUNCTION IS OF GREAT INTEREST IN CASES WHER LEGAL DOCUMENTS ARE CREATED USING SUCH DIGITAL SIGNATURE.

CERTIFICATE

A DRIVER”S LICENSE IS ACCEPTED BY NUMEROUS ORGANIZATION BOTH PUBLIC AND PRIVATE AS A FORM OF IDENTIFICATIN DUE TO THE LEGITIMACY OF THE ISSUER, WHICH IS A GOVT AGENCY. SINCE ORG UNDERSTAND THE PROCESS BY WHICH SOMEONE CAN OBTAIN A DRIVER LICENSE THEY CAN TRUST THAT THE ISSUER VERIFIED THE IDENTITY OF THE INDIVIDUAL TO WHOM THE LICENSE WAS ISSUED. A CERTIFICATE PROVIDES A MECHANISM FOR ESTABLISHING CONFIDENCE IN THE RELATIONSHIP BETWEEN A PUBLIC KEY AND THE ENTITY THAT OWNS THE CORRESPONDING PRIVATE KEY.

CERTIFICATE AUTHORITIES

- CERTIFICATE AUTHORITIES ARE SIMILAR TO A NOTARY PUBLIC, A COMMONLY TRUSTED THIRD PARTY. TN THE E-COMM WORLD, CERTIFICATE AUTHORITIES ARE THE CORRESPONDING OF PASSPORT OFFICES IN THE GOVT THAT CONCERN DIGITAL CERTIFICATE AND VALIDATE THE HOLDER'S IDENTITY AND AUTHORITY.

SECURE SOCKETS LAYER

SSL IS A PROTOCOL DEVELOPED BY NETSCAPE CORPORATION. SSL PROVIDES A RELATIVELY SECURE METHOD TO ENCRYPT DATA THAT ARE TRANSMITTED OVER A PUBLIC NETWORK SUCH AS THE INTERNET, ALSO OFFERS SECURITY FOR ALL WEB TRANSACTION, INCLUDING FILE TRANFER PROTOCOL AND TELNET-BASED TRANSACTIONS. IT PROVIDES AN ELECTRONIC WRAPPING AROUND THE TRANSACTION THAT GO THROUGH THE INTERNET. AUTHENTICATION BEGINS WHEN A CLIENT REUESTS A CONNECTION TO AN SSL SERVER. THE CLIENT SENDS ITS PUBLIC KEY TO THE SERVER,WHICH IN TURN GENERATES A RANDOM MESSAGE FROM THE SERVER AND

- TO IMPLEMENT SSL IN A WEB SERVER, THE FOLLOWING STEPS ARE FOLLOWED;1. CREATE A KEY PAIR ON THE SERVER.2 DEMAND A CERTIFICATE FROM A CERTIFICATE AUTHORITY.3 SET UP THE CERTIFICATE.4 ACTIVATE SSL ON A SECURITY FOLDER OR DIRECTORY. IT IS NOT A GOOD IDEA TO ACTIVATE SSL ON ALL THE DIRECTORIES BECAUSE THE ENCRYPTION OVERHEAD CREATED BY SSL DECREASES SYSTEM PERFORMANCE.

ADANTAGES AND DISADVANTAGES OF SSL

- AUTHENTICATION;PERMITS WEB- ENABLED BROWSERS AND SERVER TO AUTHENTICATE EACH OTHERS.
  ACCESS LIMIT; PERMITS CONTROLLED ACCESS TO SERVERS, DIRECTORIES, FILES, AND SERVICES.
  DATA PROTECTION; GUARTEES THAT EXCHANGED DATA CANNOT E CORRUPTED WITHOUT DETECTION.
  INFORMATION SHARE; PERMITS INFORMATION TO BE SHARED BY BROWSERS AND SERVERS WHILE REMAINING OUT OF REACH TO THIRD PARTIES.

- DISADVANTAGES;

  1.SIMPLE ENCRYPTION; THIS MIGHT INCREASE THE CHANCES OF BEING HACED BY COMPUTER CRIMINALS.
  2.STOLEN CERTIFICATE/KEY; ONE IMP DRAWBACK OF SSL IS THAT SERTICATES AND KEYS THAT ORIGINATE FROM A COMPUTER CAN BE STOLEN OVER A NETWORK OR BY OTHER ELECTRONIC MEANS.
  3.CUSTOMER'S RISK;CUSTOMERS RUN THE RISK THAT A MERCHANT MAY EXPOSE THEIR CREDIT CARD NUMBERS ON ITS SERVER, IN TURN, THIS INCREASES THE CHANES OF CREDIT CARD FRAUDS. 4.MERCHANT'S RISK; MERCHANTS RUN THE RISK THAT A CUSTOMER'S

SECURE HYPERTEXT TRANSFER PROTOCOL

- ANOTHER PROTOCOL FOR TRANSMITTING DATA SECURELY OVER THE WORLD WIDE WEB IS SECURE WHEREAS SSLCREATES A SECURE CONNECTION BETWEEN A CLIENT AND A SERVER, OVER ANY AMOUNT OF DATA CAN BE SENT SECURELY, SHTTP IS DESIGNED TO TRANSMIT INDIVIDUAL MESSAGES SECURELY. SSL S-HTTP, THEREFORE, CAN BE SEEN AS COMPLEMENTARY RATHER THAN COMPETING TECHNOLOGIES.

SECURE ELECTRONIC TRANSMISSION (SET)

- SET PROTOCOL IMITATES THE CURRENT STRUCTURE OF THE CREDIT CARD PROCESSING SYSTEM. SET REPLACES EVERY PHONE CALL OR TRANSACTION SLIP OF PAPER WITH AN ELECTRONIC VERSION. THIS CAN GENERATES A LARGE NUMBER OF DATA PACKETS. THE SET PROTOCOLS OFFER PACKETS OF DATA FOR ALL THESE TRANSACTION, AND EACH TRANSACTION IS SIGNED WITH A DIGITAL SIGNATURE. THIS MAKES SET THE LARGEST CONSUMER OF CERTIFICATES, AND IT MAKES BANKS BY DEFAULT ONE OF THE MAJOR DISTRIBUTORS OF CERTIFICATES.

- THE MOST IMP PROPERTY OF SET IS THAT THE CREDIT CARD NUMBER IS NOT OPEN TO THE SELLER. ON THE OTHER HAND, THE SET PROTOCOL, DESPITE STRONG SUPPORT FROM VISA AND MASTERCARD, HAS NOT APPEARED AS A LEADING STANDARD. THE TWO MAJOR REASONS FOR LACK OF WIDESPREAD ACCEPTANCE ARE FOLLOWINGS; 1. THE COMPLEXITY OF SET 2.THE NEED FOR ADDED SECURITY THAT SET PROVIDES THOUGH, THIS MIGHT CHANGE IN THE FUTURE AS ENCRYPTION TECHNOLOGY BECOMES MORE COMMONLY UTILIZED IN THE E-BUSINESS WORLD.

ADVANTAGES AND DISADVANTAGES OF SET

- SOME OF THE ADVANTAGES OF SET COPNTAIN THE FOLLOWING;
  1.INFORMATION SECURITY; NEITHER ANYONE LISTENING IN NOR A MERCHANT CAN USE THE INFORMATION PASSED DURING A TRANSACTION FOR FRAUD.
  2.CREDIT CARD SERURITY; THERE IS NO CHANCE FOR ANYONE TO STEAL A CREDIT CARD.
  3.FLEXIBILITY IN SHOPPING; IF A PERSON HAS A PHONE HE/SHE CAN SHOP.

- DISADVANTAGES OF SET; SOME OF THE DISADVANTAGES OF SET INCLUDE ITS COMPLEXITY AND HIGH COST FOR IMPLEMENTATION. PRIVACY CONCERNS MAKE, SOME PEOPLE SIMPLY DISLIKE ELECTRONIC PAYMENTS. THEY FIND THE SETUP TOO TIME-CONSUMING AND DONT WANT MORE LOGONS AND PASWORDSTO REMEMBER. OTHERS SIMPLY PREFER THE FAMILIARITY OF WRITING CHEQUES AND DROPING ENVELOPES IN THE MAIL. REGARDING OF THESE CONCERNS, ELECTRONIC PAYMENT WILL LIKELY CONTINUE TO RISE IN POPULARITY.