3.2 Online payments

3.2.1 Security measures of online payment systems

1) The Encryption Approach

Encryption is a process of converting plain text or data into ciphertext so that the transmitted information cannot be accessed by anyone other than the receiver and the sender. The idea of encryption is

(1) to secure stored data

(2) to guard information transmission.

There are various types of encryption that differ in features as well as the context of deployment. Nevertheless, Public Key Encryption and Symmetric Key Encryption are the two most popular methods implemented at large by the ecommerce industry.

In Public Key Encryption two mathematically correlated digital keys are used, which are a private key and a public key, while in Symmetric Key Encryption, both the receiver and the sender use identical keys to encrypt and decrypt the information.

2)Secure Socket Layer (SSL)

Developed by Netscape Communications Corporation, Secure Socket Layer, or SSL, is apparently the most prevalent security model deployed by e-commerce businesses worldwide to secure its payment channels.

The SSL implements data encryption, optional client authentication, server authentication, and message integrity for TCP/IP connections. The protocol's design aims to prevent eavesdropping, tampering of information, and forgery while transmitting data over the Internet between two interacting applications.

Secure Socket Layer is a traditional protocol, widely adopted across the ecommerce industry. It meets the following security provisions −

- Encryption
- Authentication
- Non-reputability
- Integrity

"http:/" is used for HTTP URLs without SSL, whereas for HTTP URLs with SSL, "https://" is applied.

3)Secure Hypertext Transfer Protocol (S-HTTP)

S-HTTP enhances security over the internet by empowering the HTTP internet protocol with authentication, public key encryption, and digital signatures.

Secure HTTP strives to make transactions more secure by negotiating encryption schemes used between a server and the client. Created to coexist and seamlessly integrate with the HTTP, it enables optimal end user security through multiple defence mechanisms.

4) Secure Electronic Transaction (SET)

The SET specification, collaborated by MasterCard and VISA, ensure the safety of all parties involved in an e-commerce transaction. It is specifically designed to perform critical functions like –

- Authenticating cardholders and merchants
- Ensuring confidentiality of information and payment data
- Define protocols and electronic security service providers

Secure Electronic Transaction enables interoperability between applications across diverse platforms and operating systems. SET integrates the following components −

- **Digital Wallet Software** − Secures cardholder's online purchases via point and click interface.
- **Merchant Software** − Helps merchants interact with financial institutions and customers in a secure manner.

- **Payment Gateway Server Software** − Provides support for merchant's certificate request, enabling an automatic and standard payment process.

- **Certificate Authority Software** − Assists financial institutions issue digital certificates to merchants and cardholders to register for secure electronic commerce.

5) Safe Login Screen

It is critical to make the login system as secure as possible. Otherwise, it will be easy for the hackers to infiltrate and get access to sensitive data. Implementing this safety protocol is moderately easy, but it can efficiently ward off many security threats.

6) Digital Signature

Digital signature is an encrypted message with a unique private key capable of verification. The signature is linked to the data in such a way that in case the data is altered, the electronic signature is automatically invalidated.

Securing the safety and confidentiality of customer's' payment information is a serious issue. The above guidelines will help e-commerce enterprises decrease the possibility of security breaches, boosting their confidence to expand businesses online.

7) PCI Compliance

One of the first steps to take is to make sure your payment system is Payment Card Industry (PCI) compliant. The Payment Card Industry Security Standards Council was formed in 2006 to regulate major payment brands and help merchants keep their customers' financial data safe. It's their prerogative to maximize information security by implementing 12 security requirements.

8) Updated Operating Systems

It's also smart to stay current with all security updates that are available for your business's network of computers. Because hackers are constantly coming up with new techniques, it's critical to stay one step ahead. If you haven't done so already, you should sign up for automatic updates for your entire network.

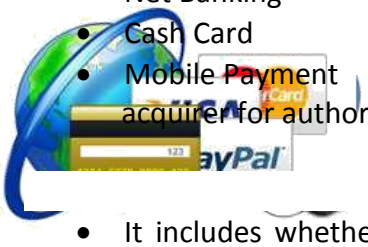
3.2.2 Payment gateways

Payment gateways is a software that facilitates the communication of Transaction information.

- A payment gateway is a software program integrated to a merchant's website to transmit transaction data to

  - Credit Card
  - Net Banking
  - Cash Card
  - Mobile Payment

  acquirer for authorization and settlement.



  - It includes whether there are sufficient funds available, whether the details all matched correctly and whether there has been any fraudulent activity.

- In order to check these details, the Payment Gateway will communicate with the Card Schemes and Issuing Banks.
- And then report back with its findings and relevant transaction response.

  - Merchants gain the ability to perform real-time Credit Card authorizations from website over the Internet.
  - Customers can pay for purchases across the Internet through Credit Cards within seconds, after the gateway obtains authorization from the Credit Card institutions.

EXAMPLE

- Payment gateway protect credit card details encrypting sensitive information such as credit card number.
- To insure that information passes securely between the customer and the merchant and also between the merchant and the payment process.

Concept of NEFT, RTGS,IMPS

NEFT : National Electronic Funds Transfer (NEFT) is a nation-wide payment system facilitating one-to-one funds transfer. Under this Scheme, individuals can electronically transfer funds from any bank branch to any individual having an account with any other bank branch in the country participating in the Scheme.

Transaction Timings :

Monday to Saturday(Except 2nd and 4th Saturday)

Timings : - 8:00 AM to 6:30 PM

How does NEFT system operate

Step 1: First of all, the remitter has to provide the requisite information like

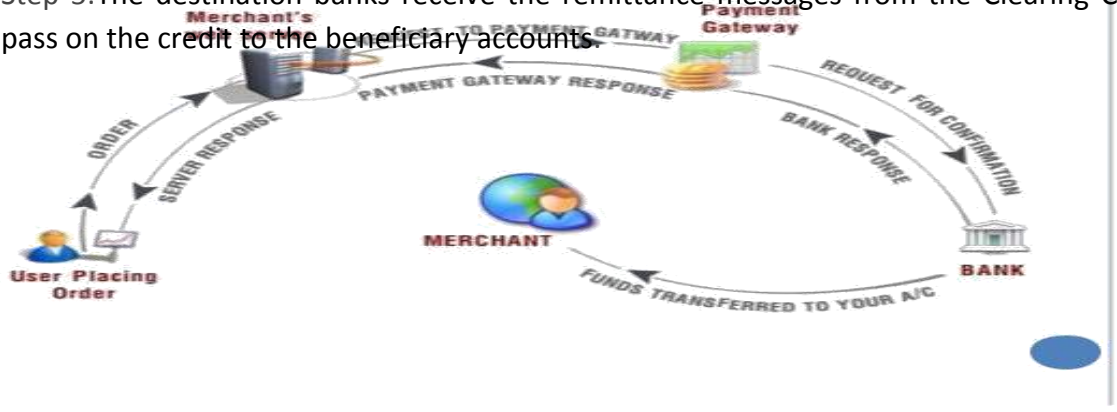
- Beneficiary's Name.
- Beneficiary's Account number.
- Beneficiary's Account type (cash credit, loan account, etc)
- Bank name, location & base branch in which the beneficiary account is held.
- IFSC code of beneficiary bank etc in order to start the process of NEFT.

Step 2: The bank branch at which the fund transfer request originated, prepares a message and sends it to its pooling centre (also called the NEFT Service Centre).

Step 3: The pooling centre forwards the message to the NEFT Clearing Centre (operated by the National Clearing Cell, RBI, Mumbai) to be included in the next available batch.

Step 4: The RBI at the clearing centre sorts the transactions bank- wise and prepares accounting entries to receive funds from (debit) the originating banks and give the funds to (credit) the destination banks. Thereafter, bank-wise remittance messages are forwarded to the destination banks through their pooling centre (the NEFT Service Centre).

Step 5:The destination banks receive the remittance messages from the Clearing Centre and pass on the credit to the beneficiary accounts.



Benefits :

- Faster – Its faster and more convenient than sending Demand Drafts / Cheques / Telegraphic Transfers.
- Easier – Forget long queues and time-consuming DDs, cheques and pay orders! No need to visit the bank branch and search for a courier.
- Reach – No Geographical limitations within India as long as it is a participating bank in the RBI's RTGS/NEFT system.

Indian Financial System Code(IFSC)

- IFSC Code is 11 digit code for identifying the bank and branch
- Used by both RTGS and NEFT finance transfer systems
- code consists of 11 characters-
- first 4 characters – entity
- fifth position - '0'
- last 6 characters – branch number

E.g. (ICIC0000039) is an IFSC code of one of the branches of ICICI Bank.

RTGS

'RTGS' stands for Real Time Gross Settlement, which can be defined as the continuous (real-time) settlement of funds individually on an order by order basis (without netting).
'Real Time' means the processing of instructions at the time they are received rather than at some later time.
'Gross Settlement' means the settlement of funds transfer instructions occurs individually (on an instruction by instruction basis). Considering that the funds settlement takes place in the books of the Reserve Bank of India, the payments are final and irrevocable.

The RTGS system is primarily meant for large value transactions. The minimum amount to be remitted through RTGS is Rs 2 lakh. The maximum limit is Rs 10 lakh per day.

NEFT Vs RTGS

S. NO	Criteria	NEFT	RTGS
1.	Settlement	Done in batches (Slower)	Real time (Faster)

2.	Minimum amount of moneytransfer limit	No Minimum	1 lacs
3.	Maximum amount of money transfer limit	No Limit	No Limit
4.	When does the Credit Happen in beneficiary account	Happens in the hourly batch between Banks	Real time between Banks
5.	Maximum Charges as per RBI	Upto 10,000 – Rs 2.5 from 10,001 – 1 lac – Rs 5 from 1 – 2 lacs – Rs 15 Above 2 lacs – Rs 25	Rs 25-30 (Upto 1 – 5 lacs) Rs 50-55 (Above 5 lacs) (Lower charges for first half of day)
6.	Suitable for	Small Money Transfer	Large Money Transfer

IMPS

The IMPS (Immediate Payment Service) from Bank helps you access your bank account and transfer funds instantly and securely.
You can send money using Net banking on an internet-powered laptop or PC.

IMPS enable you to transfer funds from your account to any account of same bank or different bank account. The beneficiary account is credited immediately when a fund transfer request is made from your side.

This service is available 24x7, throughout the year including Sundays and any bank holiday.

Objective of IMPS

- Available – 24*7*365
- No more sharing of bank account details

- Instant
- Payment – Simple, convenient
- Time & cost saving
- Safe & secure
- Immediate Confirmation
- Use existing payments infrastructure (existing ATM networks)

Online Payment System using Mobile apps :

PayTm:

PayTM is one of the largest mobile commerce platforms in India, offering its customers a digital wallet to store money and make quick payments.

One97 is cloud based company which provide various online services like Online Mobile recharge, Gas bill payment, Dish Tv recharge, Bus ticket Booking, Track the bus before boarding, Mobile Games, Online shopping, Direct selling on their website, online wallet, Payment solutions etc. It was established by Vijay Shekhar Sharma in 2000 in Delhi.

One97 Pvt. Ltd. sell all their services under a brand name PAYTM. Paytm is their brand to provide the services like Recharge, Online shopping, ticket booking etc. Customer can get their services from the website of Paytm i.e. www.paytm.com or the mobile/tablet application of all smart phone platforms like Android, ios, Blackberry, windows.

Service Quality of PayTm:

1. **Access**: - The Access of their website and the application is very great. The size of website is so less that anyone can open it even with the 2G internet connection. The mobile application is also easily available ontheir respective platforms.
2. **Availability**- Service of Paytm recharge is a cloud based service so it is available by 24x7. Customer can easily access their website or app and recharge their mobile number even at mid night also.

3. **Commitment-**Paytm make a commitment/mission, “One97 delivers mobile content and commerce services to millions of mobile consumers through India’s most widely deployed telecom applications cloud platform.”

4. **Communication**- The way of communication of one97 under Paytm brand is totally different then the other online recharge operators. They provide an customer care email id which customer can use 24x7. They create the two way communication by using social networking like facebook, twitter, LinkedIn, blog.

5. **Functionality**- One97 continually working on increasing their ability to handle the Internet traffic. It enhances the server capacity and maintain it by server experts. It handles so many services at a hand including mobile recharge.

6. **Reliability**- The tag line of Paytmconfense "Seal of Trust".

7. **Responsiveness-** The main big Credit worthiness is of one97 is their "Response to Customer" system. They provide 24x7 email support to consumer queries. But there is a gap in tele communication at One97. They did not provide direct customer care executive contact but they provide a number at where customer can record their complains and after analyzing that they call back to the customer in come cases.

BHIM

Bharat Interface for Money (BHIM) provides fast, secure, reliable medium to make digital payments through your mobile phone using UPI (Unified Payment Interface) platform via Mobile App and USSD (Unstructured Supplementary Service Data) platform via *99# service.

BHIM is developed by the National Payment Corporation of India (NPCI), a not-for-profit company for providing retail payment systems in the country under guidance from Reserve Bank of India.

BHIM has been designed for quick and secure user on-boarding, BHIM has been a huge boon for merchants who can now accept payments directly into their bank accounts.

How does it work?

After downloading the app, give necessary permission and verify mobile number linked with bank account. Register your bank account with BHIM, and set a UPI PIN for the bank account using last 6 digits of your debit card and expiry date. Your mobile number is your payment address (PA), and you can simply start transacting.

Send / Receive Money: Send money to or receive money from friends, family and customers through a mobile number or payment address. Money can also be sent to non UPI supported banks using IFSC and MMID. You can also collect money by sending a request and reverse payments if required.

Check Balance: You can check your bank balance and transactions details on the go.

Custom Payment Address: You can create a custom payment address in addition to your phone number.

QR Code: You can scan a QR code for faster entry of payment addresses. Merchants can easily print their QR Code for display.

Transaction Limits: Maximum of Rs. 10,000 per transaction and Rs. 20,000 within 24 hours. The limit for USSD has currently been set at ₹5,000 per day.

Benefits:

1. 1 digital payment app for all bank accounts.
2. Money remains in your bank account, so you earn interest.
3. No charges from using BHIM app infra, minimal UPI charges from banks for making transactions.
4. Simple, secure and light.
5. BHIM framework *99# works without internet.
6. Transaction from ₹ 1/- to ₹ 10,000/-
7. Daily transaction limit of ₹ 20,000/-

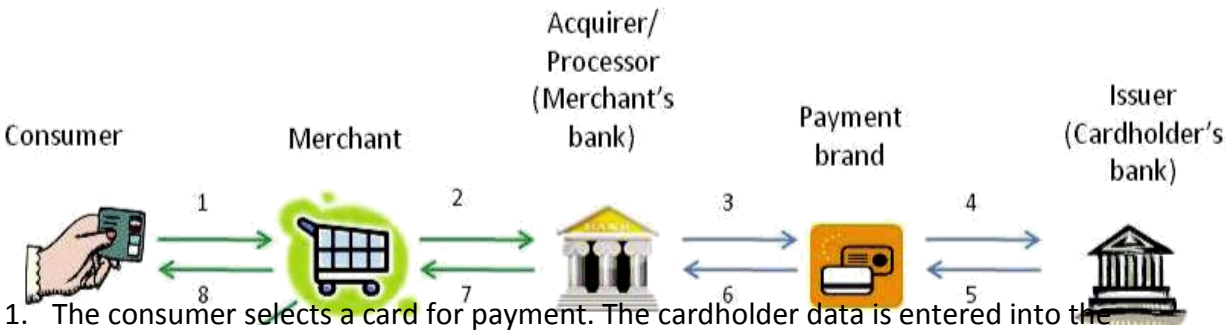
Online payment process through Credit and Debit Card

DEBIT CARD

- Debit card is a plastic card which provides a alternative payment method to cash when making purchases.

- Functionally, it can be called an electronic check, as the funds are withdrawn directly from either the bank account, or from the remaining balance on the card.
- It is also known as BANK CARD or CHECK CARD.
- Debit cards can also allow for instant withdrawal of cash, acting as the ATM card for withdrawing cash and as a cheque guarantee card. Merchants can also offer "cash back"/"cash out" facilities to customers, where a customer can withdraw cash along with their purchase.
- It is used instead of a check to make purchases, anywhere Visa is accepted
- It is used instead of a credit card to pay bills such as utilities, insurance and car payments
- PIN-system security
- Change your PIN at any Merchants Bank branch
- No annual fee

Payment process through Debit Card



1. The consumer selects a card for payment. The cardholder data is entered into the merchant's
   payment system, which could be the point-of-sale (POS) terminal/software or an e-commerce website.
2. The card data is sent to an acquirer/payment processor, whose job it is to route the data through the payments system for processing. With e-commerce transactions, a "gateway" provider may provide the link from the merchant's website to the acquirer.
3. The acquirer/processor sends the data to the payment brand (e.g. Visa, MasterCard, American Express, etc.) who forward it to the issuing bank/issusing bank processor
4. The issuing bank/processor verifies that the card is legitimate, not reported lost or stolen, and that the account has the appropriate amount of credit/funds available to pay for the transaction.
5. If so, the issuer generates an authorization number and routes this number back to the cardbrand. With the authorization, the issuing bank agrees to fund the purchase on the consumer's behalf.

6. The card brand forwards the authorization code back to the acquirer/processor.

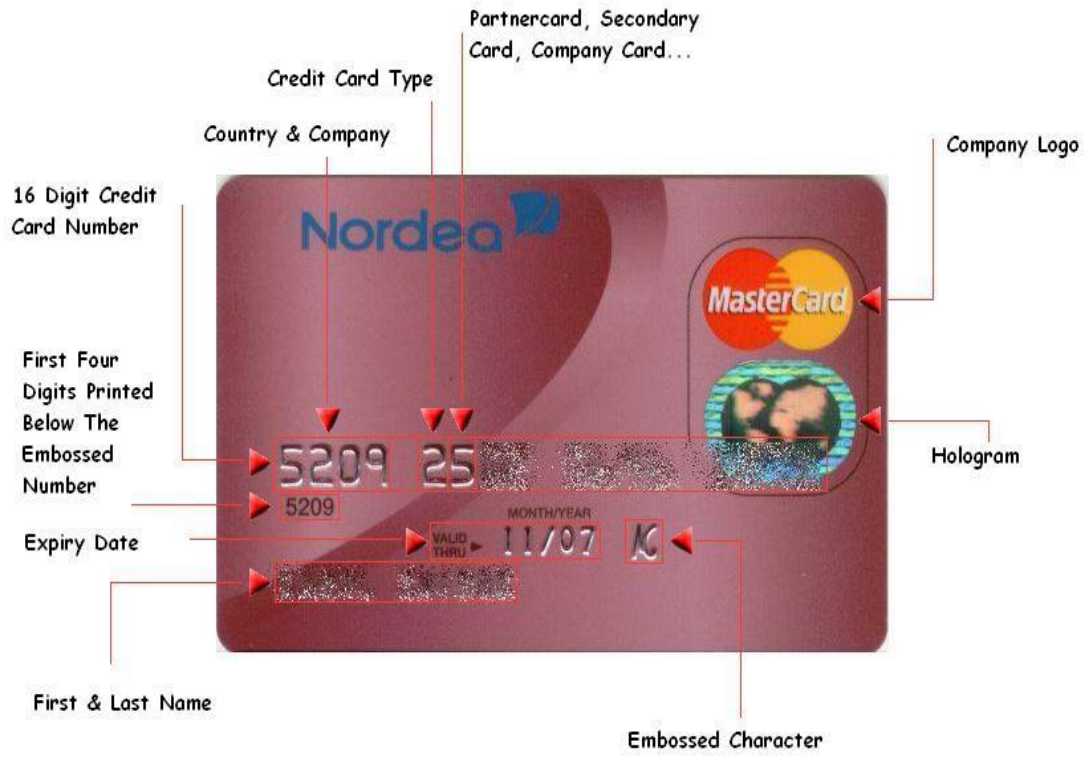
7. The acquirer/processor sends the authorization code back to the merchant.

8. The merchant concludes the sale with the customer.

Credit Card

Credit cards allow you to 'buy goods now and pay later' - called 'buying on credit'.

- They aren't linked to your bank account.
- If you don't repay your bill in full by the date shown you're charged interest on the whole amount of the bill for that month.
- The rates of interest - indicated by the APR (annual percentage rate) - is very high.
- A credit card is different from a charge card, where a charge card requires the balance to be paid in full each month.
- In contrast, credit cards allow the consumers to 'revolve' their balance, at the cost of having interest charged.



Payment Process

- AUTHORIZATION – Approval code which the merchant stores with the transaction.

- BATCHING – Transactions stored in “batches” which are send to the acquirer.
- CLEARING AND SETTLEMENT – debits the issuers for payment and credits the acquirer.
- FUNDING - Merchant receives the amount totaling the funds in the batch minus the "discount rate.”
- CHARGEBACKS - Chargeback is an event in which money in a merchant account is held due to a dispute relating to the transaction.