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## UNIT 9 PAYMENTS AND SETTLEMENT SYSTEMS

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### Objectives

After studying this unit, one should be able to:

- understand the concept of Payment and Settlement Systems
- know the structure on which the authorization of Payment Systems is based.
- Explain the Reserve Bank of India's initiatives in developing the Payment System Infrastructure
- Describe the concept of Electronic Payment Systems, their evolution and the essential characteristics of the fund transfer mechanism.
- Describe global payment systems like SWIFT.

### Structure

- 9.1 Introduction
- 9.2 Need for Payment Systems
- 9.3 Characteristics of a Payment System
- 9.4 Evolution of Payments Systems in India
- 9.5 Electronic Payment System
- 9.6 Initiatives In Developing Payment Procedures
- 9.7 Global Payment Systems
- 9.8 Real Time Gross Settlement (RTGS)
- 9.9 National Electronic Funds Transfer System
- 9.10 Cheque Truncation System (CTS)
- 9.11 National Automated Clearing House (NACH)
- 9.12 National Financial Switch (NFS)
- 9.13 Summary
- 9.14 Key Words
- 9.15 Self-Assessment Questions
- 9.16 Further Readings

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### 9.1 INTRODUCTION

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The term "payments system" describes the system in place to facilitate money transfers between individuals, businesses, and other institutions. Customers' use of cash, cards, cheques, and electronic funds transfers as well as the behind-the-scene arrangements that allow for the transfer of funds from one financial institution to another are all part of this system.

Processing and execution of payment instructions are some of the statutory obligations of the banks. Conventionally, paper-based instruments like cheques, drafts, dividend and interest warrants, refund orders, gift cheques, traveller cheques, etc., have been the modes of settling payment transactions. However, computers and communications have changed the whole mechanism of funds transfer and the settlement process into fast and automated EFT systems. An electronic funds transfer differs from a conventional transfer in that the information is processed and transmitted electronically. Interestingly many of these electronic fund transfer systems are made available online for customers to transfer funds from anywhere.

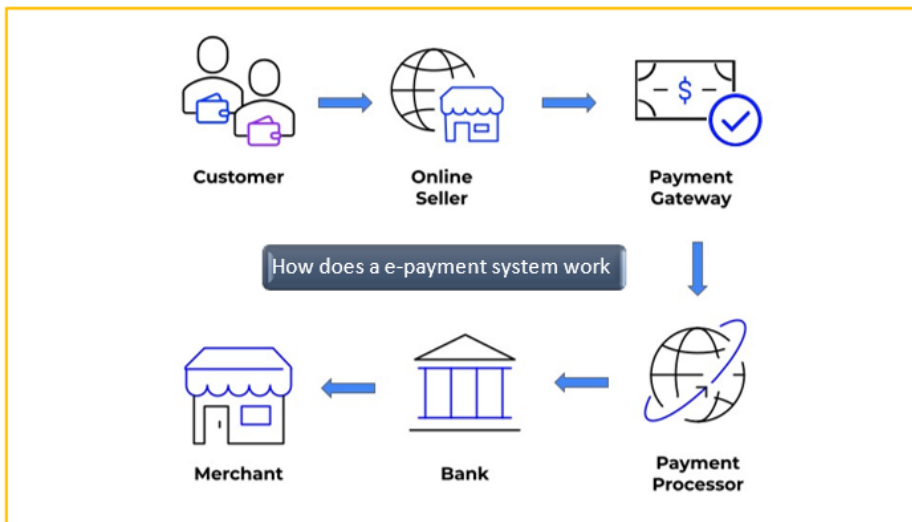
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## 9.2 NEED FOR PAYMENT SYSTEMS

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Payment systems play a vital role in the functioning of the economy by facilitating the exchange of goods and services and providing a secure, efficient, and convenient means of payment. The following are some of the important reasons for having a payment system.

1. **Convenience:** Payment systems make it easier for consumers to make purchases, as they can use various methods, such as cash, checks, credit cards, and digital payments, to complete transactions.
2. **Efficiency:** Payment systems can help to speed up transactions and reduce the time it takes to complete them. Electronic payment systems, such as UPI, can process payments in real-time, which can save both merchants and consumers time and money.
3. **Security:** Payment systems can help to reduce the risk of fraud and financial crime. Many digital payment systems use encryption and other security measures to protect consumers' personal and financial information.
4. **Financial Inclusion:** Payment systems can help increase financial inclusion by providing a means for people not served by traditional banking systems to access financial services. A mobile phone and an internet connection are enough to use electronic payment systems like UPI.
5. **Record Keeping:** Payment systems can help to keep records of the transactions, which can be useful for both merchants and customers. This record can be used for accounting, tax, and other financial purposes.
6. **Encourages cashless society:** With the use of digital payment systems, it reduces the dependence on cash and encourages a cashless society which in turn helps in reducing the flow of counterfeit notes, and also helps in tracking the black money.



### 9.3 CHARACTERISTICS OF A PAYMENT SYSTEM

The characteristics of a payment system can vary depending on the specific system in question, but some standard features are listed in the table below.

Characteristics of a payment system	
Characteristics	Description
<b>Accessibility</b>	The system should be easily accessible to all parties involved in the transaction, including consumers, merchants, and financial institutions.
<b>Security</b>	The system should have measures in place to protect against fraud and financial crime, such as encryption and authentication.
<b>Reliability</b>	The system should be reliable and able to handle large volumes of transactions without interruption.
<b>Speed</b>	The system should be capable to process transactions quickly and efficiently, with minimal delays.
<b>Interoperability</b>	The system should be capable to connect with other payment systems to facilitate transactions between different parties.
<b>Scalability</b>	The system should be capable to handle an increasing number of transactions as the volume of business grows.
<b>Flexibility</b>	The system should be able to adapt to changing consumer preferences and new technologies.
<b>Low-cost</b>	The system should have low transaction costs for the users to encourage widespread adoption.
<b>Compliance</b>	The system should comply with relevant regulations and laws related to payment systems.
<b>User-friendly</b>	The system should be simple to use and understand for

	all parties involved in the transaction, including consumers and merchants.
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## 9.4 EVOLUTION OF PAYMENTS SYSTEMS IN INDIA

The evolution of payment systems in India can be broadly divided into three phases: pre-liberalization, post-liberalization, and digitalization.

**Pre-Liberalization (pre-1991):** The payment system in India during this period was dominated mainly by government-owned banks and was primarily cash-based.

**Post-Liberalization (1991-2010):** The Indian government started liberalizing the economy in 1991, introducing private sector banks and non-banking financial companies (NBFCs). Electronic payment systems such as credit and debit cards and electronic funds transfer (EFT) were introduced during this period.

**Digitalization (2010 onwards):** With the increase in internet and mobile penetration, the Indian government has been pushing for a digital economy. This resulted in a significant increase in digital payment options such as mobile wallets, UPI, Bharat QR and e-wallets. The government has also launched various initiatives, such as the Jan Dhan Yojana, the Pradhan Mantri Mudra Yojana, and the Digital India campaign to promote digital payments.

Payment Service	Description	Launch Date	Operator
Electronic Funds Transfer	One-to-one fund transfer facility. This system has been replaced by a more efficient NEFT system for use by the general public.	1997	RBI
Real-Time Gross Settlement (RTGS)	Settlement of fund transfer orders occurs individually on a continuous and real-time basis. The minimum amount for customer transactions is Rs.2 lakh – no upper limit. The RTGS system is available on all days on a 24x7x365 basis. There is a real-time transfer of funds to the beneficiary account.	2004	RBI
National Electronic Fund Transfer (NEFT)	One-to-one fund transfer with a half-hourly net settlement. No minimum or maximum limit. Available 24x7 on all days, including holidays.	November 2005	RBI
National Electronic Clearing Service (NECS)	NECS (Credit) facilitates multiple credits to beneficiary accounts with destination branches across the country against a single debit of the sponsor bank account.	October 2008	RBI

Credit & Debit Cards	PoS terminals enable customers to make payments for goods and services through credit/debit cards. To facilitate customer convenience, the Reserve Bank has also permitted cash withdrawals using debit cards issued by the banks at PoS terminals and ATMs.	November 2009	Banks
PPIs (Cards & Wallets)	Pre-paid instruments are payment instruments that facilitate the purchase of goods and services against the value stored on these instruments. The value stored on such instruments represents the value paid for by the holders by cash, debit to a bank account, or credit card. The pre-paid payment instruments can be issued as smart cards, magnetic stripe cards, internet accounts, internet wallets, mobile wallets, paper vouchers, etc.	2009	PPI Operators
IMPS	Round-the-clock peer-to-peer fund transfer facility with immediate money transfer through multiple channels like Mobile, Internet, ATM, SMS, Branch and USSD.	November 2010	NPCI
NACH	Web-based solution to facilitate interbank, high volume, electronic transactions that are repetitive and periodic.	2011	NPCI
Cheque Truncation System (CTS)	CTS is the Process of stopping the physical movement of cheques. As per the amended Negotiable Instruments Act 1881, in cheque truncation, the movement of the physical instrument is stopped and replaced by electronic images and the associated MICR lines of the cheque.	2011	NPCI
Aadhaar-enabled Payment System	Basic banking transactions can be done at the Micro ATM of the Business Correspondent of any bank using Aadhaar authentication.	January 2016	NPCI
UPI	Peer-to-peer fund transfer facility with immediate money transfer through mobile device round the clock, 24*7 and 365 days. BHIM app supports multiple bank accounts in a single mobile application. The upper limit is Rs.2,00,000.	August 2016	NPCI
National Electronic Toll Collection	NPCI has developed the National Electronic Toll Collection (NETC) programme to meet the electronic tolling requirements of the Indian market. It offers an interoperable nationwide toll payment solution, including clearing house services for settlement and dispute management.	2016	NPCI
Bharat Bill Payment System	Umbrella system for payment of all bills.	July 2017	NPCI

Source: [https://m.rbi.org.in/scripts/BS\\_ViewBulletin.aspx?Id=18290](https://m.rbi.org.in/scripts/BS_ViewBulletin.aspx?Id=18290)

## 9.5 E-PAYMENT SYSTEM

An e-payment system, also known as an electronic payment system, is a method of conducting transactions electronically, typically over the internet. An e-payment system is a fast and convenient way for customers to make payments to merchants and receive payments from customers. It can be used for various transactions like online shopping, bill payments, and money

transfers.

### 9.5.1 Process of e-payment

The various steps involved in the process of making an e-payment are as follows:

**Selection of payment method:** The customer selects the e-payment method they want to use, such as a credit card, digital wallet, or online banking service.

**Payment authorization:** The customer's payment method is authorized by the financial institution or payment service provider. This typically involves the customer entering their personal and financial information, such as their name, credit card number, and security code.

**Payment processing:** The payment is processed by the payment service provider or financial institution. This typically involves checking that the customer has sufficient funds in their account and that the payment information is valid.

**Payment confirmation:** The customer receives a confirmation of the payment, which may include a receipt or transaction number.

**Payment settlement:** The payment is settled between the customer's financial institution and the merchant's financial institution.

**Payment reconciliation:** The merchant reconciles the payment with the customer's order, and the transaction is complete.

E-payment systems can also include additional security features such as multi-factor authentication, encryption, and fraud detection to ensure the safety of transactions.

### 9.5.2 History of electronic payment systems in India

The history of electronic payment systems in India can be traced back to the pre-liberalization era, where the payment system was mostly dominated by government-owned banks and was largely cash-based. With the liberalization of the Indian economy in 1991, the introduction of private sector banks and non-banking financial companies (NBFCs) brought about a change in the payment system.

The first electronic payment system in India was the introduction of credit and debit cards in the early 1990s. These cards were primarily used for point-of-sale transactions, and the acceptance of these cards was limited to large cities and metros. Electronic Funds Transfer (EFT) systems were also introduced during this period, which allowed for the transfer of funds between bank accounts through electronic means. With the increase in internet penetration, the Indian government started promoting the use of digital payment systems. In 2005, the Reserve Bank of India (RBI) set up the National Payments Corporation of India (NPCI), which aimed to promote electronic payments and reduce dependence on cash. NPCI introduced several digital payment systems such as the Immediate Payment Service

(IMPS) in 2010 and the National Financial Switch (NFS) in 2011.

The subsequent significant development in the history of electronic payment systems in India came with the United Payments Interface (UPI) launch in 2016. UPI is a real-time payment system allowing inter-bank transactions using a virtual address. This system has been a game changer in India and has significantly increased digital payments. The Indian government has also launched several initiatives to promote digital payments such as Jan Dhan Yojana, Pradhan Mantri Mudra Yojana, and the Digital India campaign. These initiatives have helped to increase the use of digital payment systems among the unbanked population and small businesses.

In recent years, mobile wallets and e-wallets have become increasingly popular in India. These digital wallets allow for easy and secure transactions, and have helped to increase the reach of electronic payment systems. Bharat QR, a common QR code for digital payments, was also launched by NPCI in 2016, which facilitated transactions across all merchants.

In conclusion, the history of electronic payment systems in India has been a journey from cash-based transactions to digital payments. With the increasing use of technology, the Indian government is pushing for a digital economy, and the electronic payment systems are becoming more inclusive and accessible to the population. The future of electronic payments in India looks promising, with the government's focus on building a cashless society, and with the introduction of new technologies such as blockchain and AI, the payment systems are becoming more efficient and secure.

## 9.6 INITIATIVES IN DEVELOPING PAYMENT PROCEDURES

Banks started taking small steps in implementing technology, referred to as computerization. They were installing standalone desktop PCs, which mostly helped in typing and printing jobs. Although branch-level servers were installed, accounting was distributed, and consolidation at the bank level involved manual processing.

A significant technology development in operations was achieved with the introduction of MICR<sup>1</sup> (Magnetic Ink Character Recognition) technology in 1986-87. This can be seen as the first effective introduction of technology in inter-bank operations which formed the basis for many payment system products and innovations. The cheque clearing system was the only interaction where banks met regularly which now got converted into a technology platform. There was a big gap in technology innovations and the level of understanding of it among bankers. Seeing this gap the Reserve Bank of India established IDRBT – Institute for Development and Research in Banking Technology in 1996 at Hyderabad. This Institute while conducting research and training bank officials in technology areas played a major role in spreading awareness about products, systems, applications, etc.

IDRBT established the first electronic connectivity among Indian Banks by setting up the VSAT-based INFINET Network (Indian Financial Network) through which banks could securely communicate with each other. Added to

this IDRBT was licensed as a digital signature certifying authority bringing secure authorization to interbank communication. IDRBT also setup the NFS – National Financial Switch – which enabled banks' customers to withdraw cash from any member bank's ATM where they did not have an account. Later, this was transferred to NPCIL – National Payments Corporation of India Limited.

### **INFINET Network (Indian Financial Network)**

The IDRBT, established by the Reserve Bank of India in 1996, was entrusted with increasing awareness of technology in the banking and financial sector. Apart from research, academics and training, the major technology initiatives of the Institute include setting up the first nationwide communication backbone for the INFINET. The INFINET is a CUG (Closed User Group – consisting of the Reserve Bank of India (RBI), Banks and Financial Institutions) network.

Initially, in 2001, it was set up as a VSAT (Very Small Aperture Terminal) based network communicating through an antenna which was installed on terraces or open grounds. These antennae send signals to the geo stationary satellite getting the reflected signals. The availability of the one-eighth of the satellite transponder facilitated setting up this network with 64 kbps (kilobits per second) bandwidth. Despite a 500 millisecond delay in transmission in each hop, the network was very efficient and cost-effective. With the opening up of the telecom sector, more service providers setup their networks with leased line connectivity. The availability of bandwidth increased to 2 mbps (megabits per second). This development was adopted by INFINET, and the leased-line connectivity was established, improving the efficiency of the data flow manifold.

The implementation of funds transfer systems, viz., RTGS and NEFT, in 2004 triggered a fast growth of membership of INFINET. The requirement of bandwidth increased steadily as usage of the INFINET network grew rapidly. The need for providing high bandwidth efficiently and in high availability mode needed Internet service from more than one service provider. This gave rise to integrating the networks of multiple service providers to form a single cloud of INFINET. This technology is called MPLS (Multi-Protocol Label Switching) Network. Under this system the data travels in small parts called packets. These packets have labels which identify the data or message to which they belong. When there are minor disruptions in the communication networks of one of the network service providers the packets flow through the next available network. The packets may travel without any sequence, move in different communication channels and go in different routes but when they reach the destination node they get arranged in the original sequence and get delivered to the next processing stage.

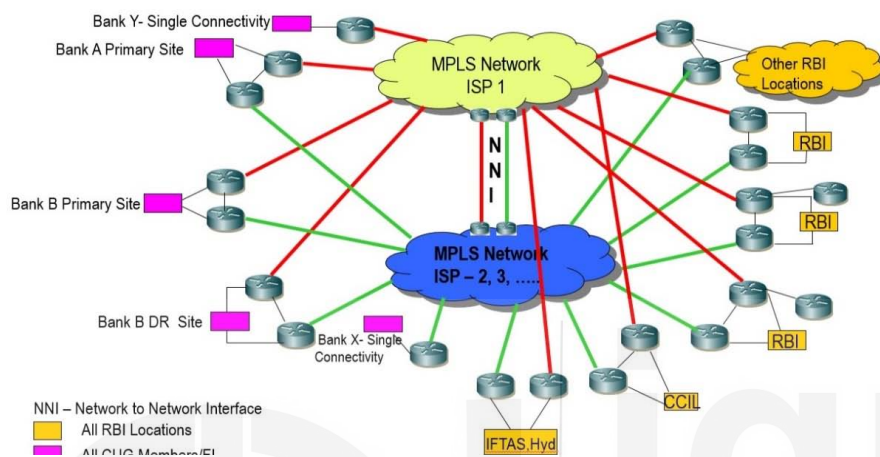
With this technology, the INFINET has its point of presence across the country having capability to connect every outlet of all banks and financial institutions. It deploys hybrid technologies using leased lines, VSATs and RF (Radio Frequency). It has redundancy at every stage resilient to network outages and having feasibility at remotest part of the country in HA (high



availability) mode to get the highest uptime of more than 99.99%.

The INFINET MPLS in its network connects RBI offices, participating banks and financial institutions through more than 1100 nodes across the country.

**Figure 9.1: IFTAS – INFINET MPLS Network Architecture**



The members can participate in the services of financial applications hosted by RBI, CCIL, interbank communications and IFTAS through the messaging platform, Structured Financial Messaging System (SFMS) using INFINET. Member's subsidiaries and sub-member banks can participate in applications through INFINET only through the member and they cannot be given direct access.

Information about other members of INFINET, which members receive during the course of participation, interaction, and transaction processing, have to be maintained in confidence. Violation of the terms and conditions laid down by INFINET a member shall attract penalties, and compensation has to be paid by the defaulting member to the violated member, RBI and the service provider of the application indemnify the stake holders. Misuse of the INFINET network may lead to suspension or termination of membership. Revocation of suspension or termination of membership is subject to satisfaction of RBI and IFTAS based on the decision of the Standing Committee and such terms and conditions as may be stipulated at the time of readmission.

IFTAS shall be the sole Service Provider and be responsible for providing infrastructure, management, supervision, and operation of the INFINET to all the member banks, financial institutions, and other participants admitted to INFINET.

Service Provider shall also provide services to Financial Institutions, such as, hosting of financial applications and related services to INFINET members in a secured environment.

The Reserve Bank of India (RBI) and the Indian Banks' Association (IBA) came up with the National Payments Corporation of India (NPCI) as a means of establishing a strong Payment and Settlement Infrastructure in India. The NPCI is an umbrella organization that runs retail payments and settlement systems in India.

Due to the usefulness of NPCI's goals, it was set up as a "Not for Profit" company under Section 25 of the Companies Act of 1956 (now Section 8 of the Companies Act of 2013), with the goal of providing infrastructure to the entire Indian banking system for both physical and electronic payment and settlement systems. The company's main goal is to improve retail payment systems by using technology to make operations run more smoothly and increase the number of people who can use payment systems.

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## 9.7 GLOBAL PAYMENT SYSTEMS

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In India, payment and settlement systems are regulated by the Reserve Bank of India (RBI). The RBI oversees various types of payment and settlement systems in the country. These payment and settlement systems play an important role in facilitating the flow of funds in the economy and promoting financial inclusion.

### **What is payment and settlement system?**

A payment and settlement system is a financial infrastructure that enables the transfer of funds between different parties. It can refer to an individual payment system like NEFT to the overall infrastructure that includes various types of payment and settlement systems.

Payment and settlement systems can be **used** for a variety of purposes, including:

- 1) Transferring funds between individuals, such as when one person pays another person using a mobile payment app.
- 2) Transferring funds between businesses, such as when a supplier is paid for goods or services.
- 3) Transferring funds between banks, such as when one bank settles a payment with another.
- 4) Clearing and settling financial transactions, such as when a credit card company settles a payment with a merchant.
- 5) Payment and settlement systems can be based on physical infrastructure, such as a network of ATMs, or electronic systems that operate over the internet or other communication networks.

### **Global Payment Systems**

Global payment systems refer to the various methods and technologies used to facilitate financial transactions between individuals and organizations in

different countries. These systems play a vital role in the global economy by allowing for the seamless transfer of funds across borders, facilitating international trade and commerce, and providing access to financial services for individuals and businesses in developing countries.

The Society for Worldwide Interbank Financial Telecommunication (SWIFT) network is one of the most widely used global payment systems. SWIFT is a global messaging network that connects over 11,000 financial institutions in more than 200 countries. It is used to send and receive messages related to financial transactions, including wire transfers, letters of credit, and other types of financial communications. The SWIFT network is highly secure and reliable and is widely considered the backbone of the international financial system.

Another important global payment system is the Automated Clearing House (ACH) network. The ACH network is an electronic network that facilitates the exchange of electronic payments between financial institutions in the United States. It is commonly used for direct deposit of payroll, electronic bill payments, and other electronic transactions. The ACH network is particularly useful for businesses and organizations that need to make regular electronic payments to employees or vendors in different locations.

There are various payment systems that operate globally, enabling the transfer of funds between countries and currencies. Some examples of global payment systems include:

**SWIFT:** The Society for Worldwide Interbank Financial Telecommunication (SWIFT) is a global network that enables financial institutions to send and receive information about financial transactions securely and efficiently. It is primarily used for international wire transfers.

**CHIPS:** The Clearing House Interbank Payments System (CHIPS) is a global payment system used to settle high-value cross-border and domestic payments. It is operated by the Clearing House, a bank-owned organization.

**Visa and Mastercard:** These are global payment networks that enable the use of debit and credit cards for electronic payments at merchants around the world.

**PayPal:** This online payment system allows individuals and businesses to send and receive payments electronically.

**Bitcoin and other cryptocurrencies:** These digital assets can be used as a medium of exchange for goods and services. They operate in an **unregulated environment** using decentralized networks and cryptography. They can be used for global transactions without the need for intermediaries.

These global payment systems play a crucial role in facilitating international trade and commerce.

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## 9.8 REAL TIME GROSS SETTLEMENT (RTGS)

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Real Time Gross Settlement, means a system where money transfers are settled continuously and in real-time, transaction by transaction (without

netting). "Real Time" means that instructions are processed as soon as they come in, while "Gross Settlement" means that each funds transfer instruction is settled on its own.

Banks and financial institutions use RTGS to transfer large amounts of money quickly and securely. It is typically used for transactions of over Rs 2,00,000 and the funds are transferred in real-time, meaning the recipient can access the funds immediately after the transaction is completed. RTGS is considered a highly secure and reliable method of money transfer and is often used for important transactions such as large business payments or government transactions.

Though both NEFT and RTGS are funds transfer settlement systems, RTGS offers a real-time settlement. At the same time, NEFT functions on a deferred settlement mechanism. The speed of RTGS transactions can be gauged from the fact that bank branches are expected to receive the funds in real-time and the beneficiary bank is required to credit the beneficiary's account instantaneously. For a funds transfer through RTGS, the sending bank branch as well as the receiving bank branch need to be RTGS enabled. Currently, there are more than 1,60,000 RTGS-enabled bank branches,

Since then, RBI has launched the Next Generation Real Time Gross Settlement (NG-RTGS) system, which not only makes it easier for India to keep up with the growing number of payments but also gives it a platform for advanced liquidity management services and functionality for dates in the future. At the beginning of 2011, it was decided that a new Application with better features was needed. So, the Next Generation RTGS system (NG-RTGS) chose to use the ISO 20022 messaging standard.

The NG-RTGS System has many advanced features, such as the ability to manage liquidity, a messaging system based on extensible markup language (XML) that complies with ISO 20022, and monitoring and control systems for information and transactions that work in real-time.

Some of the features of RTGS are:

- The RTGS is a safe and secure way to send money.
- The system is available 24 hours a day, 7 days a week, 365 days a year.
- Funds are sent to the beneficiary account in real-time.
- A Unique Transaction Reference (UTR) number is a 22-character code that identifies a transaction in the RTGS system in a way that no other transaction can.
- NEFT is a way to send money electronically, and all transactions received up to a certain time are processed at once. In RTGS, on the other hand, transactions are processed continuously throughout the day, one transaction at a time.
- As of December 14, 2020, RTGS is available 24 hours a day, seven days a week, 365 days a year. The RTGS system is mostly used for transactions with large amounts of money.
- With RTGS, the least amount that can be sent is Rs. 2,00,000/-, and there

is no maximum amount that can be sent.

- To help banks make sense of the service fees they charge for transferring money through the RTGS system, a broad framework of fees has been set up.
  - a) Transactions going in are free and don't cost anything.
  - b) Transactions made outside the country: Rs. 2,00,000/- to Rs. 5,00,000/-: not more than 25/- (exclusive of tax, if any)
  - c) Over Rs. 5,00,000: not more than Rs. 50 (exclusive of tax, if any)
- Banks can choose to charge less than the rates set by RBI, but they can't charge more.
- RTGS credit will only be given to the customer's account based on the account number provided in the RTGS remittance instruction or message.
- RTGS system does not accept future value-dated transactions. Suppose the failed payment isn't returned on time. In that case, the customer who made the payment can get compensation equal to the current repo rate plus 2%.

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## 9.9 NATIONAL ELECTRONIC FUNDS TRANSFER SYSTEM

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The goal of the National Electronic Funds Transfer (NEFT) System is to set up a way to transfer and clear money electronically so that the current paper-based system doesn't have to work so hard. In November 2005, it went on sale. Reserve Bank of India stated that the objective of the NEFT system is to create an Electronic Funds Transfer system to facilitate an efficient, secure, economic, reliable and expeditious system of funds transfer between banks in the banking sector using Structured Financial Messaging Solutions (SFMS) backbone. Unlike Real-time gross settlement (RTGS), fund transfers through the NEFT system do not occur in a real-time basis. NEFT settles fund transfers in half-hourly batches, with 23 settlements occurring between 8:00 AM and 7:30 PM on week days and the 1st, 3rd and 5th Saturday of the calendar month. NEFT, launched in 2005 with 8 participating banks, has currently more than 160 banks live on the system. As per the RBI, close to 130,000 bank branches are enabled for NEFT transactions.

NEFT facilitates one-to-one transfers between two banking accounts (like RTGS, though settlement routines are different). It allows individuals, firms and corporates to electronically transfer money from any bank branch to another individual, firm or corporate having a banking account with any other NEFT-enabled bank branch in India. NEFT has grown tremendously from its inception in 2005. The growing popularity of NEFT is reflected in the value and volumes of business during the last few years. In 2019, the value of NEFT transactions has reached nearly INR 2,50,000 Bn and the total number of transactions is 2319 Mn. The volumes and value of NEFT transactions have grown at a CAGR of approximately 50% from 2011 to 2019.

NEFT's increasing popularity is due to the various benefits that it offers over other modes of Funds transfer. The growth of NEFT up to now can be similarly gauged by the same representative monthly figures; Feb 2017 had 148.2 million NEFTs valued at Rs 10877.9 billion, i.e., the monthly remittance has crossed Rs 1 trillion mark comfortably. NEFT has emerged as a preferred method for conducting account-to-account transfers and local remittances. NEFT is now used for various purposes, including person-to-person remittance, salary, pension, payment of credit card dues, payment of bank EMIs and utility bill payments among others.

NEFT payments originate a message from CBS in the sending bank branch, and is delivered from a central Gateway in the bank to (NPCI operating for) RBI. For NEFT, RBI has provided client software to their NEFT system to banks, and secured connections have been laid between RBI and Bank's set-up. The bank collects data in batches at the Gateway and it gets picked up by RBI system. Clearing among bank-wise batch totals happens in RBI, on a net settlement basis, upon which, all credit payments in that batch from all banks are good for payment; these then, get bank wise sorted and pushed to banks for direct electronic credit to target bank accounts. The settlement for banks is in RBI books.

The Reserve Bank of India (RBI) owns and runs the National Electronic Funds Transfer (NEFT), a Central Payment System for the whole country. Individuals, businesses, and corporations with accounts at any NEFT member bank can send money electronically to any individual, business, or corporation with an account at any other NEFT member bank in the country.

### **Benefits of NEFT**

When sending or getting money, NEFT has the following benefits.

- Every day of the year, you can get help at any time.
- Funds are sent to the beneficiary account and settled safely in real-time.
- An extensive network of branches of all kinds of banks covers the whole country of India.
- The person who gets the paper instruments doesn't have to go to a bank branch to deposit them. If the sender's bank offers internet banking, they can start the transfer from their home or place of work.
- Positive confirmation to the sender by SMS or e-mail when the money has been deposited into the recipient's account.
- Interest charges for transactions that are late being credited or returned.
- RBI doesn't charge banks anything.
- Online NEFT transactions from a savings bank account do not cost the customer anything.
- RBI has put a limit on transaction fees.
- The law supports the deal.
- Money can be sent from India to Nepal in only one direction.

- The NEFT system can be used for more than just sending money. For example, it can be used to pay credit card dues to the banks that issued the cards, pay loan EMIs, send foreign exchange to India, etc.
- When a customer wants to send money through NEFT, they start the Process by sending an online funds transfer request through a bank branch or the internet/mobile banking service. The person sending the money must give the following information.

The maximum transaction charges that beneficiary banks can levy are:

up to ₹10,000	Not exceeding ₹2.50 (+ Applicable GST)
above ₹10,000 upto ₹1 lakh	Not exceeding ₹5 (+ Applicable GST)
above ₹1 lakh and upto ₹2 lakh	Not exceeding ₹15 (+ Applicable GST)
above ₹2 lakh	Not exceeding ₹25 (+ Applicable GST)

## 9.10 CHEQUE TRUNCATION SYSTEM (CTS)

Truncation is the Process of stopping the flow of a physical cheque from the drawer (and, in all cases, the presenting bank) to the drawee (and, therefore, the drawee bank). In place of a physical cheque, the clearing house sends an electronic image of the cheque to the drawee bank, along with information about the MICR band, the date of presentation, the presenting bank, etc.

The main **features** of cheque truncation system are:

- 'CTS' is the Process of stopping the physical movement of cheques from Banks to clearing houses and processing the Electronic images of the cheques.
- Three types of images bearing the following standards are captured
- Front - Gray scale (Minimum DPI:100, Format: JFIF, Compression: JPEG)
- Front - Black and White (Minimum DPI:200, Format: TIFF, Compression: CCIT G4)
- Back - Black and White (Minimum DPI: 200, Format: TIFF, Compression: CCIT G4)
- The MICR data in the Cheques will be captured as present on the MICR band.
- Amount is captured manually using the capture solution.
- Captured images and data, are exchanged across the banks at the CTS facility in the clearing house.
- The Images and Data are transmitted over a secure network.
- The Settlement of the CTS happens based on MICR data captured from the cheques.
- Physical cheques are retained at the presenting bank itself.

### 9.10.1 Participation Model in CTS

1. *Direct*: Bank has its Capture and Clearing House interface (CHI) infrastructure and participates on its own.

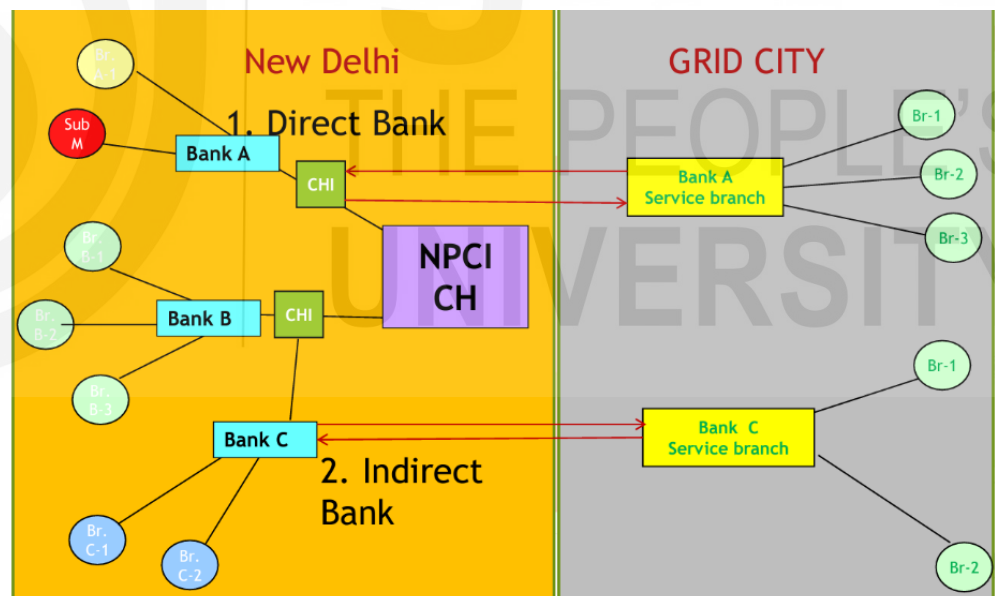
Indirect: Bank has its Capture infrastructure; however it uses the CHI infrastructure of another bank.

2. *Sub-Member*: Sub-member is one who is an extended branch of another bank. They will not have their MICR code and identity in the clearing process. They will route all their transactions through the sponsor bank, and settlement will happen in the books of the sponsor bank.
3. *Service Bureau*: Capture infrastructure is established by the vendor and they will have an arrangement with a third party bank for using their CHI infrastructure.

### 9.10.2 GRID CTS

Grid-based Cheque Truncation System (CTS) has been launched in Chennai, Mumbai, and Delhi, covering several States and Union territories. The goal is to cover the whole area with a single CTS. A GRID is like a regional office in the CTS system used all over the country.

Figure 9.2: GRIDWork flow



Under the Negotiable Instruments Act of 1881, all states and Union Territories shown in the above grid have different holiday schedules. As local clearing houses are slowly absorbed into the CTS, it has become important to develop a policy for uniform holidays to ensure that grid-based CTS operations run smoothly.

1. Each bank in a Regional Clearing house, or GRID, will only have one CHI.
2. The bank can connect to the clearing house through one of the three GRID clearing centres.



3. The files processed in each city will be brought together at the bank level and sent to their CHI, which in this case, is Chennai.
4. Each bank in the GRID will have a single settlement. For example, the settlement for the southern GRID will be made in Chennai.
5. One of the most essential parts of the "Paper to follow" Process is that government checks and IQA (Image Quality Assurance)-failed checks will be physically given to the drawee bank.

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## 9.11 NATIONAL AUTOMATED CLEARING HOUSE (NACH)

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The National Automated Clearing House (NACH) is an electronic clearing service (ECS) developed by the National Payments Corporation of India (NPCI). The system is used for bulk transactions, such as salary and pension payments, and recurring expenses, such as utility bills.

The NACH system allows for the efficient and automated processing of large transaction volumes, saving time and reducing the risk of errors. It also enables transactions to be processed in real-time, ensuring that funds are credited to the beneficiary's account on the same day.

One of the critical features of NACH is its flexibility. It can process various transactions, including direct debit, credit, and e-mandates. This allows organizations to use the system for multiple payments, such as loan instalments, insurance premiums, and mutual fund investments.

Another advantage of NACH is its security. The system uses a two-factor authentication process, which ensures that only authorized parties can initiate and authorize transactions. This provides an added layer of protection for both the payer and the payee.

The NACH system is also user-friendly. It provides a simple and intuitive interface that users with limited technical expertise can easily navigate. This makes it easy for organizations of all sizes to use the system, regardless of their technical capabilities.

NACH system is a powerful and reliable tool for processing bulk and recurring payments. Its flexibility, security, and user-friendliness make it an ideal solution for organizations of all sizes. With the government promoting digital payments the use of the NACH system will see massive growth in the coming years. It is a win-win situation for organizations and customers as it ensures timely, safe and efficient transactions.

**NACH's Aadhaar Payment Bridge (APB) System**, uses the table of Aadhaar No., and bank code, bank account number of a customer; this table is, called Aadhaar Map per, and NPCI maintains it. Banks daily update it to NPCI for changes if any. Govt. pays its DBT payment by sending a file to its account-maintaining bank to debit Govt., and credit beneficiaries. The govt. file has the customer Aadhaar number only, and the payment amount. So the paying bank debits Govt., and sends credit to NPCI and the payees 'Amount - vs- Aadhaar list. NPCI system, using the map per, sends payments through NACH to the various banks maintaining customer accounts, providing

customer bank, branch, Account No., Aadhaar No., Amount, etc., so that automated postings can happen.

### **NACH Debit**

Used by an institution for pulling funds from large number of payers across multiple banks creates multiple debits to different destination bank accounts and a corresponding single credit to Sponsor bank account, who sends the debit file

Examples - Direct Debit of Bill payment, Insurance Premium, Mutual Fund SIP, Loan EMI, school fees etc., against previously given mandates.

### **NACH Credit**

Used by an institution for affording credit to a large number of beneficiaries

Single debit to the sponsor bank's account and multiple credits to different destination banks' account

Examples - Dividend Payments, Interest payments, Bonus, Commission, Salaries, Pay-outs, etc.

### **APBS (Aadhaar Payment Bridge System)**

Used by an institution for disbursement of subsidies/government benefits to a large number of beneficiaries. Single debit to the sponsor bank's account and multiple credits to different destination banks' account

Examples - LPG Subsidy, Pensions, MNREGA etc.

This is mostly for Govt. use to disburse benefits/subsidies, etc.

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## **9.12 NATIONAL FINANCIAL SWITCH (NFS)**

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At a meeting on September 24, 2009, the Board for Regulation and Supervision of Payment and Settlement Systems (BPSS) agreed, in principle, to let NPCI run different retail payment systems in the country. On October 15, 2009, the Reserve Bank of India also gave NPCI permission to take over the operations of NFS from the IDRBT "as is, where is." On December 14, 2009, NPCI took over running NFS.

### **What is an ATM Network?**

A bank's ATMs are all connected to its ATM switch. An ATM network is a more extensive network formed by connecting the ATM switches of various banks. There can be a 2-bank network or a multi-bank network of banks. If a particular bank is not part of any ATM network and if it does not have any bilateral agreement with any other bank, then its customers will be able to operate at its own ATMs only.

An ATM network brings 'Inter-operability' for banks' customers by allowing them to operate at ATMs of other Banks as well, which are part of the network.

**On-Us:** It is a transaction in which a customer uses the same bank ATM and

ATM Card, e.g. SBI cardholder using SBI ATM.

**Off-Us:** It is a transaction in which a customer uses different banks' card and ATMs; e.g. SBI cardholders making use of an ICICI Bank ATMs.

This Off-us can be transacted if these two banks' (ICICI and SBI) switches have a direct connection (bilateral connection) or both are in a network with more banks (say 3, 5, 10) with a common central switch.

On a larger scale now, all banks' ATM switches in India, are now connected to NFS, forming a country-wide single network, and all bilateral connections have been discontinued:

- a. The ASA (Authentication Service Agency) is connected to UID (Unique Identifies) by leased lines. Similarly, AUA is connected to ASA. There can be a sub-AUA, i.e., agencies/BC organizations with their systems collect the authentication data from field devices and exchanging it with banks.
- b. NPCI, as ASA, offers customer authentication gateway services to banks and non-bank financial companies, clearing and settlement activity (for OFF-US), and an AEPS DMS (Dispute Management System) to handle interbank disputes.

Any ATM network, including NFS, handles off-us transactions of Banks only. On-Us transactions are handled by issuing bank only between its ATM and its own ATM switch.

Some ATM Transaction definitions are given below.

**Approved:** ATM has dispensed cash, either full or partial amount

**Declined:** ATM has not dispensed cash. The transaction has been declined at switch and CBS.

**Business Decline:** Declines based on the customer behaviour or business logic, e.g. Invalid Account, Invalid PIN, Exceeds Funds Available, Exceeds Withdrawal Limit etc.

**Technical Decline:** Declines due to technical issues, i.e. Hardware/Application/Network/Power failures.

The NFS 24X7 Helpdesk team monitors and raises alerts to internal teams and NFS members to ensure the service is resumed at the earliest.

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## 9.13 SUMMARY

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The payment system in India is a complex network of various institutions and technologies that facilitate financial transactions within the country. The Reserve Bank of India (RBI) acts as the regulator of the payment system in India and oversees the operations of various institutions such as banks, non-bank entities, and payment service providers. India's most widely used payment systems are the National Electronic Funds Transfer (NEFT) and the Real-time Gross Settlement (RTGS) systems. These systems are discussed in

details in this unit. The new technologies such as blockchain and digital currencies which have emerged as potential disruptors of the global payment systems are also discussed. In conclusion, the payment system in India is a complex network of various institutions and technologies that facilitates financial transactions within the country.

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## 9.14 KEY WORDS

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**Payments System-** describes the system in place to facilitate money transfers between individuals, businesses, and other institutions.

**e-payment system-**also known as an electronic payment system, is a method of conducting transactions electronically, typically over the internet.

**Payment and Settlement System** is a financial infrastructure that enables the transfer of funds between different parties.

**Real Time Gross Settlement (RTGS)-**is a real-time funds transfer system that facilitates the transfer of large-value transactions between banks on a gross settlement basis.

**National Electronic Fund Transfer (NEFT) -**is an electronic funds transfer system that allows individuals and businesses to transfer funds between banks on a deferred net settlement (DNS) basis.

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## 9.15 SELF-ASSESSMENT QUESTIONS

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1. What do you understand by the term 'Payments Systems'? Discuss the characteristics of a Payment System.
2. Explain the Evolution of Payments Systems in India.
3. Describe the IFTAS- INFINET MPLS Network Architecture.
4. What is payment and settlement system? Explain the payment systems that operate globally giving suitable examples.
5. Describe the National Electronic Funds Transfer (NEFT) System. What are the benefits of NEFT when sending or getting money?

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## 9.16 FURTHER READINGS

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<https://www.ciscopress.com/articles/article.asp?p=2460771>

[www.npci.org.in/PDF/cts/notified-documents/GRID\\_CTS\\_Implementation\\_Northern\\_Grid.pdf](http://www.npci.org.in/PDF/cts/notified-documents/GRID_CTS_Implementation_Northern_Grid.pdf)

<https://www.npci.org.in/who-we-are/about-us>