→ What is Information Way?

- I-way is the basic building block for E-comm. It is made of different networks available worldwide.
- Electronic commerce needs a network infrastructure to transport the content-text, audio, video, graphics etc. The network infrastructure that provides such a data transmission facility is called I-Way or information super highway.
- Thus, information super highways can be defined as the high capacity, electronic and interactive pipeline to the consumer or business premise that is capable of supporting large number of ecommerce applications simultaneously.
- It is called interactive because it provides two-way communication between users and service providers or between one user and another user.
- It is called high-capacity electronic pipeline because it must provide broadband link.
- Telecommunication networks, cable TV networks, cellular networks and other wireless networks like satellite network, fiber optic network etc.
- These networks are interconnected to form internet that supports high speed information exchange worldwide.

Any successful E-commerce application will require the I-Way infrastructure in the same way that regular commerce needs the interstate highway network to carry goods from point to point. A myriad of computers, communications networks, and communication software forms the nascent Information Superhighway (I-Way). The I-Way and yet-to-be developed technologies will be key elements in the business transformation. And while earlier resulted in small gains in productivity and efficiency, integrating them into the I-Way will fundamentally change the way business is done. These new ideas demand radical changes in the design of the entire business process. I-Way is not one monolithic data highway designed according to long-standing, well-defined rules and regulations based on well-known needs. The I-Way will be a mesh of interconnected data highways of many forms: telephone wires, cable TV wires, radio-based wireless-cellular and satellite. The I-Way is quickly acquiring new onramps and even small highway systems.

The I-way can be defined as:-

- Building block of E-commerce
- Technologies to integrate Business Process
- Mediator for Digital transmission of Digital Content/Message/File/DATA
- The interaction between Entities of business like Supplier/Distributor/partner
- A framework with security & ease

→ Components of I-Way

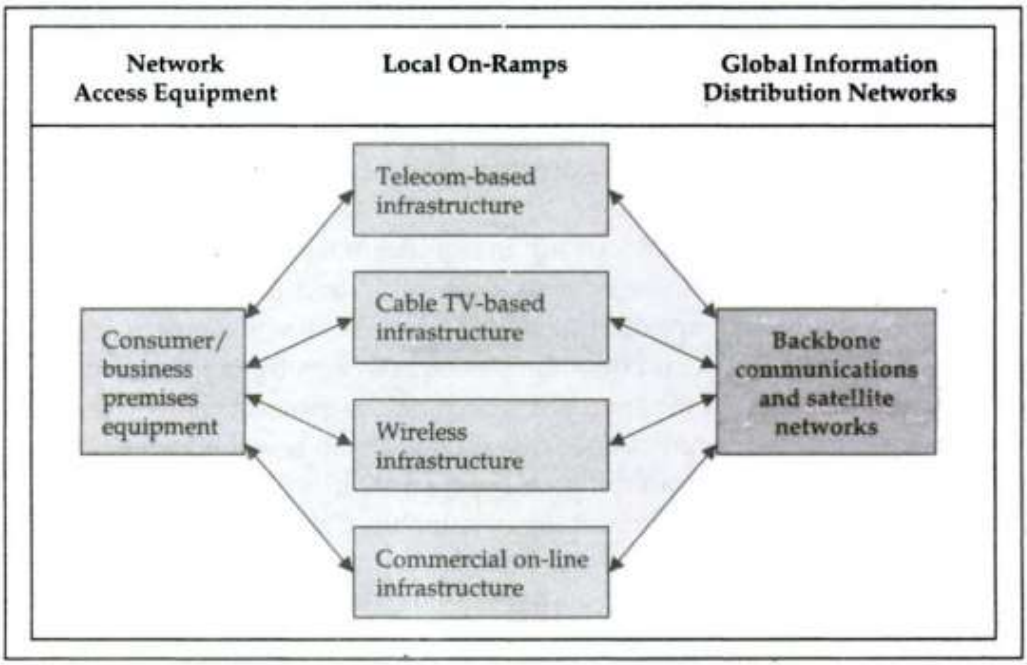


Figure 2.1 Components of the Information Superhighway infrastructure

Network Access Equipments (CAE – Consumer Access Equipment)

- These are the devices at consumer end and enables consumers to access the network. It consists of hardware and software.
- Hardware component includes devices such as computers, modems, routers, switches etc. for computer networks, set-top boxes, TV signal descramblers etc. for television networks, Cell phones etc. for cellular networks and so on.
- And software systems installed in those hardware devices includes browsers, operating systems etc.
- The type of consumer access equipment used depends upon the communication mode used. These equipments are also called customer premise equipments or terminal equipments.

CAE includes hardware and software vendors who provide:

- Physical devices – routers, switches etc.
- Access devices – computers, set-top boxes etc
- Software platforms – browsers, operating systems etc.

Local on ramps (access roads)

- Local or access road, or on-ramps refers to links between businesses, universities, and homes to the communications backbone (Global Network).
- These are the network infrastructure that provides linkage between businesses, homes, and schools to global information distribution network. This component is often called the last mile in telecommunication industry.
- Access road providers can be divided into four categories: Telecom based, Cable TV based, Wireless based, and Computer based online systems.
- Main function of access roads is to connect consumers with e-commerce applications.

1. Telecom Based Access Roads

- Telecom industries provides high speed electronic pipeline which is capable for carrying large volume of audio, video, and text data.
- These industries provide network infrastructure for long distance and local telephone communication.
- This network infrastructure is useful for ecommerce application to be connected with Global Information Distribution Network.
- Main limitation of telecom-based access roads is that it continues to depend on analog transmission of data although the industry is rapidly introducing advanced digital transmission technologies.
- However, most of the trunk lines are replaced with high-capacity optical fiber in recent days, local loops are still connected by using copper wire. The customers are constrained with limited capacity of these wires.
- Thus, the telecom industries need to replace these copper wires with high-capacity optical fiber to handle expected flood of information from ecommerce applications.

2. Cable TV Based Access Roads

- Cable television systems also provides high-capacity broadband network infrastructure to connect large number of customers with their system.
- These systems adopt digital transmission of data and have a lot of unutilized capacity which can be useful for transmitting information from ecommerce applications to customers.
- Cable TV based systems can be of two types: wired cable TV, wireless cable TV.
- In wired cable TV based systems connects customers mainly by using coaxial-cables. But in recent days they are replacing trunk lines from optical fibers whereas local loops are based on coaxial cable links.

- This further strengthened the capacity of cable TV based network infrastructure and provides ecommerce applications with more capacity links.
- Now, cable TV companies have started to use wireless communication to connect customer homes in cost effective way rather than using optical fiber or coaxial cable-based interconnection.
- Direct Broadcast Satellite (DBS) is used for wireless cable TV transmission. It uses Super high frequency (SHF) channels to transmit data over the air.
- These signals are received by special antennas mounted in roofs of subscribers and then it is distributed within the building with help of coaxial cable.
- With help of DBS, it is easy to make cable TV in rural areas at affordable cost. Thus, emergence of wireless cable TV infrastructure makes it easy to provide ecommerce services in rural areas also. Although there are lots of benefits of wireless cable TV network infrastructure, it also suffers from limitations. For example, heavy rainfall may cause picture quality degradation or interruption.

3. Wireless Based Access Roads

- Wireless operators provide network infrastructure by using radio frequencies which are Omni directional waves and have high penetration power.
- The wireless-based systems have revolutionized the ways of thinking about information delivery. Technology is the most important factor.
- The rapid growth in technology has impacted the wireless industry in a number of ways:
- Apart from the voice calls, the cellular technology today has also facilitated short messaging services (SMS) using alphanumeric display and the multimedia services.
- Internet connectivity using the cellular networks has been made possible.
- The cellular networks using the analog technology are now upgrading to digital networks to provide greater capacity at lower costs as well as increase the quality and functionality of the cellular network.
- Applications have been developed to facilitate mobile workers to exchange messages and data from their offices while on the road.
- Thus, wireless based access enables customers to access ecommerce application from anywhere at any time and ecommerce service providers can provide content and services to customers on the basis of location.

4. Commercial online infrastructure

- The Internet is the global system of interconnected mainframe, personal and wireless computer networks that use the protocol suite TCP/IP to link billions of devices worldwide.

- It is a network of networks that consists of millions of private, public, academic, business, and government networks of local to global scope, linked by a broad array of electronic, wireless, and optical networking technologies.
- Internet, intranets and extranets are providing online services which provides 24-hour computer based supermarkets to customers.
- It targets a wide range of ecommerce applications such as video on demand, home shopping, email, information publishing, information retrieval, video conferencing and many more.
- The demand of these online services is increased dramatically due to widespread use of PCs in homes and businesses.
- Due to low hardware costs and enhanced graphics and multimedia support, customers are fast attracted towards online services entertainment, education, shopping, and information services.
- ISP provides Internet access, employing a range of technologies to connect users to their network and thus provides access roads for ecommerce applications.

Global Information Distribution Networks (GIDNs)

- They are the infrastructure that is connecting countries and continents. These networks are long distance high speed networks. There are mainly two mediums to be used for this; 1. Satellite networks, 2. Fiber optic networks.
- They include the long-distance telephone lines, satellite networks, and the internet. Long distance telephone connectivity is provided through cable by the inter-exchange carriers.
- Long distance cellular networks are using the wireless technologies to connect the consumers worldwide.
- Satellite networks play a vital role in the communication industry. They have advantages over the terrestrial networks in that:
    - They are accessible from any point of the globe.
    - They can provide broad band digital services to many points without the cost of acquiring wire/cable installation.
    - They can add receiving and sending sites without significant additional costs.

→ Requirement of I-Way

The success of e-commerce-based business depends on the information flow and to make information flow smooth and capable I-way is required.

The success or failure of any creativity, product or services is a key driver of market forces.

The underlying of market drives of I-way is important because e-commerce applications are dependent on the underlying I-way.

→ Functions of I-Way

- It develops business relationship among all sorts of business and with people all around the world by the help of global information distribution network.
- It is used for communicate between the business partners at any locations through the network communications.
- It acts as an information system for any organizations.
- I-Way controls unwanted information distributed over the complex network.
- It allows multiple forms of messages, sent and received over the same network.

→ Write a note on Wireless Access Point (WAP)

A wireless access point (WAP) is a hardware device or configured node on a local area network (LAN) that allows wireless capable devices and wired networks to connect through a wireless standard, including Wi-Fi or Bluetooth. WAPs feature radio transmitters and antennae, which facilitate connectivity between devices and the Internet or a network.

A WAP is also known as a hotspot.

Wireless access points (WAP) may be used to provide network connectivity in office environments, allowing employees to work anywhere in the office and remain connected to a network. In addition, WAPs provide wireless Internet in public places, like coffee shops, airports and train stations. Wireless access points are most commonly thought of in the context of the 802 series of wireless standards, commonly known as Wi-Fi. While there are other wireless standards, the vast majority of the time the terms Wi-Fi hotspot and WAP are synonymous.

→ Write a note on STB (Set Top Boxes)

A set-top box is a hardware device that allows a digital signal to be received, decoded and displayed on a television. The signal can be a television signal or Internet data and is received via cable or telephone connection. In the past, set top boxes were mostly used for cable and satellite television. The STB could deliver more channels than a television's own channel numbering system. It received signals containing data for multiple channels and filtered out the channel a user wanted to view. The numerous channels were generally transmitted to an auxiliary channel on the television. Other features included a decoder for pay-per-view and premium channels.

Today, most STB systems have two-way communication, allowing for interactive features like adding premium channels directly from the device or incorporating Internet access.

A set-top box is also known as set-top unit.

The evolution of set-top boxes can be traced back to early 1980s, when a cable converter box was required to receive extra analog cable TV channels and convert them to content capable of being displayed on a regular television screen. The cable converter boxes came with a wired or wireless remote control, which helped to switch a channel to a low-VHF frequency for viewing on the TV. Some newer television receivers significantly reduced the need for external set-top boxes but they are still in wide use. Cable converter boxes are sometimes required to descramble premium cable channels and receive interactive services such as pay per view, video on demand and home shopping channels.

Set-top boxes can be divided into several categories ranging from simple boxes that receive and descramble incoming AV signals, to complex units delivering a slew of services such as videoconferencing, home networking, IP telephony, video on demand and satellite broadband TV services.

The set-top boxes can be broadly classified into the following types:

• Cable Converter Box: Converts any type of channels broadcasted from a cable television service into analog radio-frequency signals on a single VHF channel. This unit can enable a noncable-ready television to receive cable channels. Some of these cable converter boxes can also descramble the signals to manage many channels that are carrier-controlled and access-restricted.

• TV Signal Sources: These include Ethernet cable, a satellite dish, DSL(Digital subscriber line is a family of technologies that are used to transmit digital data over telephone lines) connections, a coaxial cable, broadband over power line or even an ordinary VHF or UHF antenna.

• Professional Set-Top Box: These are also referred to as integrated receiver/decoders designed especially for robust field handling and rack mounting environments. These are generally used in the professional broadcast audio or video industry and include a unique feature for producing uncompressed serial digital interface signals.

• Hybrid: These came into existence in late 2000s and became popular among both pay-TV and free-to-air set-top box businesses. Hybrid set-top boxes facilitate the traditional TV broadcast from cable, satellite and terrestrial providers and combine it with the video output provided over a network and personal multimedia content. Hence, they give users a wide variety of viewing content, eliminating the need for having a separate box for each service.

• IPTV (Internet Protocol TV): These set-top boxes are small computers that allow two-way communication on an Internet Protocol network and the decoding of video streaming media.

→ E-com transaction models (business models)

E-commerce business models can generally be categorized into the following categories.

- Business - to - Business (B2B)
- Business - to - Consumer (B2C)
- Consumer - to - Consumer (C2C)
- Consumer - to - Business (C2B)
- Business - to - Government (B2G)
- Government - to - Business (G2B)
- Government - to - Citizen (G2C)

Business-to-Business (B2B)

A website following the B2B business model sells its products to an intermediate buyer who then sells the products to the final customer. As an example, a wholesaler places an order from a company's website and after receiving the consignment, it sells the end product to the final customer who comes to buy the product at the wholesaler's retail outlet.

B2B identifies both the seller as well as the buyer as business entities. B2B covers a large number of applications, which enables business to form relationships with their distributors, re-sellers, suppliers, etc.

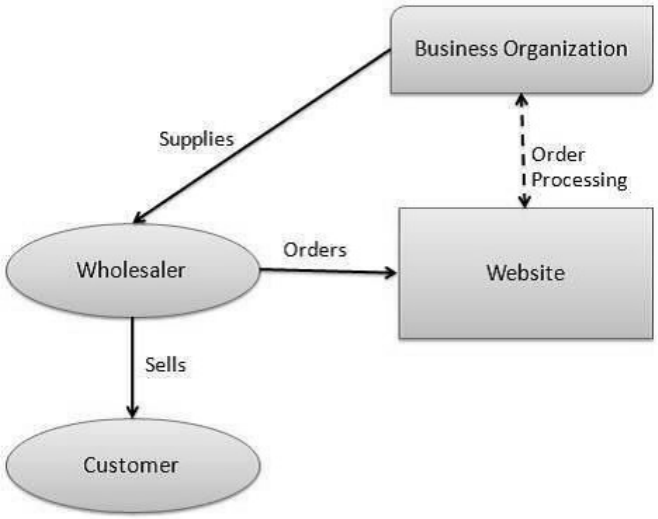
Following are the leading items in B2B e-commerce:

- Electronics
- Shipping and Warehousing
- Motor Vehicles
- Petrochemicals
- Paper
- Office products
- Food
- Agriculture

Following are the key technologies used in B2B e-commerce:

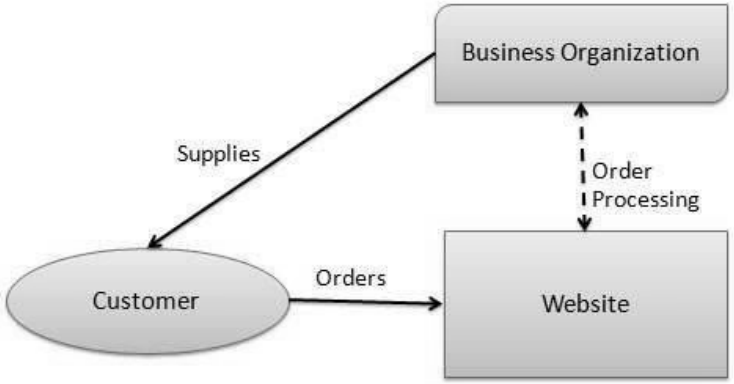
- Electronic Data Interchange (EDI) – EDI is an inter-organizational exchange of business documents in a structured and machine processable format.

- Internet − Internet represents the World Wide Web or the network of networks connecting computers across the world.
- Intranet − Intranet represents a dedicated network of computers within a single organization.
- Extranet − Extranet represents a network where the outside business partners, suppliers, or customers can have a limited access to a portion of enterprise intranet/network.
- Back-End Information System Integration − Back-end information systems are database management systems used to manage the business data.



Business-to-Consumer (B2C)

- The most traditional transaction type from a consumer's point of view is the B2C model. This model mimics a purchase that made in-store at a brick and mortar location but occurs entirely online.
- Businesses sell goods straight to consumers through their website. The internet serves as a marketplace in itself and the e-Commerce store serves as the portal between businesses and consumer shopping online.
- Online stores are able to list multiple products and SKUs which gives customers many options to pick and choose from during their buying experience. This allows for more options for a customer to research and find the perfect fit.
- Clothing, electronics, and outdoor recreational equipment are just a few of the products that effectively sold online in the B2C.
- The B2C transaction is not limited to products, but services are quite often distributed in this fashion as well. Businesses may offer services like financial advising, tutoring, subscription memberships, and others to grow their presence online.



- In B2C model, a business website is a place where all the transactions take place directly between a business organization and a consumer.
- In the B2C model, a consumer goes to the website, selects a catalog, orders the catalog, and an email is sent to the business organization. After receiving the order, goods are dispatched to the customer. Following are the key features of the B2C model.
    - Heavy advertising required to attract customers.
    - High investments in terms of hardware/software.
    - Customer support and good customer care service.

Consumer Shopping Procedure:

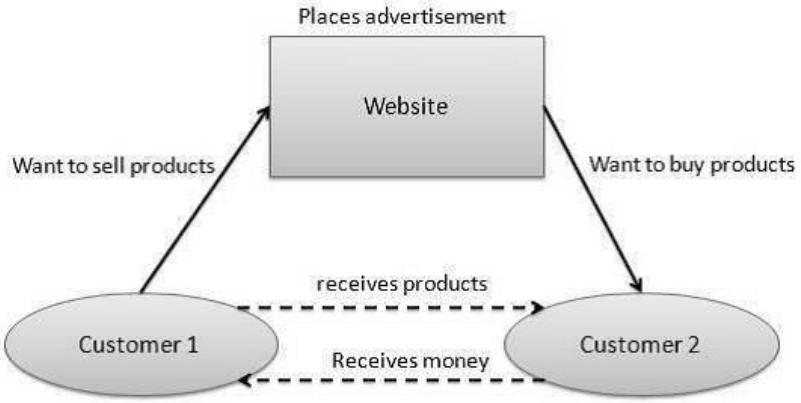
A consumer −

- Determines the requirement.
- Searches available items on the website meeting the requirement.
- Compares similar items for price, delivery date or any other terms.
- Places the order.
- Pays the bill.
- Receives the delivered item and review/inspect them.
- Consults the vendor to get after service support or returns the product if not satisfied with the delivered product.

Consumer-to-Consumer (C2C)

- With the rise of e-Commerce, much innovation has taken place in many forms. The internet itself is a powerful marketplace in and of itself. Other marketplaces have come to fruition to offer consumers shopping options and pathways to obtain desired products.

- Platforms like eBay, OLX, Quikr, and even parts of Amazon allow consumers to sell to consumers. This bridge allows men and women to sell goods without setting up a personalized store. This results in fast and easy individual transactions allowing for niche items, used goods, and individual listings to be sold online.
- In the C2C model, the platform itself does not own or sell any products. Rather, it serves as the bridge between the consumer selling and consumer buying. They act as a third party to oversee and authorize the transaction to ensure it goes smoothly.
- Popular platforms became successful due to a high amount of users and traffic while offering a solution to get rid of goods with little cost and overhead. Selling an item on these sites can be as simple as opening the app or site, creating an account, listing the item, and waiting for another consumer to purchase. No additional marketing is needed which leaves more profit in the seller's pockets.
- This type of model is becoming increasingly prominent with the inception of different marketplaces looking to gain a share of the market opportunity. C2C opportunities increase consumer buying power by eliminating many steps of the buying process.



Business-to-Government (B2G)

B2G model is a variant of B2B model. Such websites are used by governments to trade and exchange information with various business organizations. Such websites are accredited by the government and provide a medium to businesses to submit application forms to the government.

B2G, which stands for business-to-government, refers to the business relationship a company can have with a government institution. It commonly refers to the offering of products, services, or information online.

We also call this way of doing business **B2A (Business-to-Administration)**. The term refers to a company doing business either with the government or the public sector.

In many cases, government agencies work with pre-negotiated contracts. The government puts out tenders which companies bid for. To put out a tender means to ask companies to say formally how much they would charge for a project. We call each formal submission a 'bid.' The government selects one of the bidders, and that company gets the B2G contract.

Government to Business (G2B)

Governments use B2G model websites to approach business organizations. Such websites support auctions, tenders, and application submission functionalities.

G2B (Government to Business) is a term that refers to the relationships between organizations (subjects) of public administration and enterprises (businesses). The designation can be used for any relationship between the subject of public administration and the enterprises as one of the basic e-Government models (other model are G2E, G2C or G2G). In G2B model the initiative comes from a government organization and businesses are the target group. Some sources distinguish also B2G (Business to Government) where the initiative comes from businesses, while other sources consider both G2B and B2G as equal without important no significant difference, ie. with the same meaning.

Examples of G2B / B2G services are:

- government procurement
- electronic procurement marketplaces
- electronic auctions
- e-learning
- electronic incorporation forms
- updating corporate information
- sending filled-out electronic forms (eg tax forms, social insurance forms)
- sending electronic payments
- sending / receiving answers electronically

Government to Citizen (G2C)

Governments use G2C model websites to approach citizen in general. Such websites support auctions of vehicles, machinery, or any other material. Such website also provides services like registration for birth, marriage or death certificates. The main objective of G2C websites is to reduce the average time for fulfilling citizen's requests for various government services.

→ E-Commerce payment systems

E-com payment systems can be categorized into following:

1) Banking and financial payments
    a. Bank to Bank transfer
    b. Retailing payment or small scale payment
    c. Home Banking
2) Retailing payment
    a. Credit cards
    b. Private label credit/debit cards
    c. Rechargeable smart cards
3) On-line e-com payment
    a. Electronic cash (Digital cash)
    b. Electronic Checks (Net cheque)
    c. Smart card or debit cards

→ Electronic Cash

E-cash is a concept in online payment system that combines computerized ease of use with security and privacy.

Due to its versatility, it can be used with many e-com systems.

The objective of e-cash is to replace paper cash primarily in e-com payment, and secondarily in face to face transactions.

E-cash payment system defers from debit and credit card. Like E-cash, credit – debit cards can not be given away. Credit/debit cards are restricted for use by a single owner, While e-cash is a

legal tender that has monetary value for the bearer. Use of the debit & credit cards require an account relationship with a bank, while e-cash does not.

Properties of e-cash:

- E-cash must have monetary value
- E-cash must be interoperable
- E-cash must be storable and retrievable
- E-cash must be secure (temper proof)
- E-cash must be copied
- Double spending of e-cash must be detectable.
- E-cash is purchased from currency server of bank government body (RBI) or authorized bank.

Disadvantages of e-cash:

- E-cash (legal tender) can not be divided into smaller amounts
- Electronic cash can be easily duplicated
- Since it is a digital currency, there is always risk of theft and forgery.

Advantages of e-cash:

- Instant payment across the globe
- Transactions can be tracked, so there is always proof of payment
- Illegal and fraudulent transactions can be reduced

→ E-Brokerage

E-brokerage allows users to buy and sell stocks electronically and obtain information with the help of a website. Almost all e-brokerage houses have simple sign-up and provide users the ability to make them their own financial manager. With the advent of widespread Internet connectivity and smart devices, e-brokerage has seen significant growth.

E-brokerage is capable of offering lower prices than traditional brokerage techniques, as the need for brokers or financial advisers are eliminated in the case of e-brokerage. To attract more customers and retain existing users, most e-brokerage firms provide a number of tools, technical indicators which give real-time information and help in research and decision making.

E-brokerage has many benefits for its users. Users can have more flexibility as well as control over their portfolios and transactions. One can access their brokerage account at any time, even if trading hours are over. The biggest advantage of e-brokerage is that the commission cost is significantly lower than in case of services of a professional broker. Again, trades are

processed quickly in e-brokerage and there are no delays, unlike traditional brokerage methods.

→ Credit Card

Payment using credit card is one of most common mode of electronic payment. Credit card is small plastic card with a unique number attached with an account. It has also a magnetic strip embedded in it which is used to read credit card via card readers. 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.

Credit Card Payment Process

Step 1 Bank issues and activates a credit card to the customer on his/her request.

Step 2 The customer presents the credit card information to the merchant site or to the merchant from whom he/she wants to purchase a product/service.

Step 3 Merchant validates the customer's identity by asking for approval from the card brand company.

Step 4 Card brand company authenticates the credit card and pays the transaction by credit. Merchant keeps the sales slip.

Step 5 Merchant submits the sales slip to acquirer banks and gets the service charges paid to him/her.

Step 6 Acquirer bank requests the card brand company to clear the credit amount and gets the payment.

Step 7 Now the card brand company asks to clear the amount from the issuer bank and the amount gets transferred to the card brand company.

→ Debit Card

Debit card, like credit card, is a small plastic card with a unique number mapped with the bank account number. It is required to have a bank account before getting a debit card from the bank.

The major difference between a debit card and a credit card is that in case of payment through debit card, the amount gets deducted from the card's bank account immediately and there should be sufficient balance in the bank account for the transaction to get completed; whereas in case of a credit card transaction, there is no such compulsion.

Debit cards free the customer to carry cash and cheques. Even merchants accept a debit card readily. Having a restriction on the amount that can be withdrawn in a day using a debit card helps the customer to keep a check on his/her spending.

→ Smart Card

Smart card is again similar to a credit card or a debit card in appearance, but it has a small microprocessor chip embedded in it. It has the capacity to store a customer's work-related and/or personal information. Smart cards are also used to store money and the amount gets deducted after every transaction.

Smart cards can only be accessed using a PIN that every customer is assigned with. Smart cards are secure, as they store information in encrypted format and are less expensive/provides faster processing. FamPay and Dhani cards are examples of smart cards.

→ E-Cheque

eCheck is a digital version of a paper check and is also known as an electronic check, online check, internet check, and direct debit. eChecks use the Automated Clearing House (ACH) to direct debit from a customer's checking account into a merchant's business bank account, with the help of a payments processor. This makes them a fast, secure, and convenient way to pay for goods or services online.

These payments are facilitated by the "Automated Clearing House" (or ACH) network, an electronic network used by financial institutions. With an ACH merchant account, a business can withdraw payments for goods or services directly from their customer's bank account. The payment must be authorized by the customer, either by signed contract, acceptance of a website's "Terms and Conditions," or a recorded voice conversation.

There are a few steps involved to process an electronic check:

1. Request authorization: The business needs to gain authorization from the customer before making the transaction. This can be done via an online payment form, signed order form, or recorded phone conversation.
2. Payment set-up: After authorization, the business inputs the payment information into the online payment processing software. If it is a recurring payment, this information also includes the details of the recurring schedule.
3. Finalize and submit: Once information is properly entered into the payment software, the business clicks “Save” or “Submit” to start the ACH transaction process.
4. Deposit funds: The payment is automatically withdrawn from the customer’s bank account, the online software sends a payment receipt to the customer, and the payment itself is deposited into the business’ bank account. Funds are typically deposited into the merchant’s bank account three to five business days after the transaction is initiated.

The best way to explain the similarities and differences of ACH, EFT, and eCheck is that an eCheck is a type of electronic funds transfer (EFT) that uses the Automated Clearing House (ACH) network to process the payment.

With an eCheck, the money is electronically withdrawn from the payer’s account, sent via the ACH network to the payee’s banking institution, and then electronically deposited into the payee’s account. This is all done similar to paper check processing, just electronically.

→ E-wallet

E-wallet is a type of pre-paid account in which a user can store his/her money for any future online transaction. An E-wallet is protected with a password. With the help of an E-wallet, one can make payments for groceries, online purchases, and flight tickets, among others.

A digital wallet is a convenient and secure way to store and manage your payment information. With a digital wallet, you can make purchases online or in person without having to enter your payment details each time. You can also use your digital wallet to send and receive money, track your spending, and view your transaction history. Some digital wallets even allow you to earn rewards or cash back on your purchases.

To use a digital wallet, you will need to create an account with a provider and link your payment methods, such as a credit or debit card. Once your account is set up, you can start using your digital wallet to make payments quickly and easily.

Importance of Digital Wallets

Digital wallets, also known as e-wallets, have become a major part of modern technology. Many people use digital wallets for transactions rather than other payment methods.

Importance of digital wallets:

- Digital wallets allow for faster, more convenient, and more secure transactions.
- They can help reduce the risk of fraud and other security threats.
- Digital wallets can also help users manage their finances more effectively.
- They are increasingly popular among consumers.
- Digital wallets eliminate the need for carrying a physical wallet for transactions.
- They allow users to send money to friends and family across the world.
- Digital wallets eliminate the need for a bank account for transactions.
- They are helping developing countries participate in the global finance market.

There are three different **types of digital wallets** and they are as follows:

- Closed Wallet: Closed wallets are digital wallets that are created by companies that deal with products or services, and allow users to transact only with the issuer of the wallet or other users of the same wallet. Examples of closed wallets include Ola Money and Amazon Pay.
- Semi-Closed Wallets: Semi-closed wallets are digital wallets that allow users to make transactions at listed merchants and stores by making both online and offline payments. In order for merchants to accept payments from these wallets, they must sign an onboarding agreement with the issuer of the wallet. Paytm Wallet is an example of a semi-closed wallet.
- Open Wallets: Open wallets are digital wallets that can only be issued by banks or institutions partnered with another major bank. These wallets allow users to make the same transactions as semi-closed wallets, but also offer the additional feature of being able to withdraw money from ATMs.

→ Security on Web (HTTP, SSL and TSL)

HTTPS (Hyper-Text Transfer Protocol Secure) is the secure version of HTTP, the system used to send information between a web browser and website. The 'Secure' aspect is supported by Transport Layer Security (TSL), formerly known as SSL, and helps protect personal user data like credit card numbers, passwords and addresses.

It is a protocol that is used for the secure communication over computer networks. The secure transfer of data over the Internet is essential for all businesses to prevent wiretapping and attacks by middlemen. Although technically not a protocol, Secure Hyper Text Transfer is the result of layering the HTTP on top of the SSL/TLS protocol.

A secure connection is preferred when transferring sensitive information, such as personal data, social security numbers, or credit card details. The transfer of data becomes secure by ensuring that data is encrypted between the client and the server. A short term key will be converted into a long term asymmetric secret key that will be unreadable to anyone trying to intercept data which is being passed over the Internet. The server holds the public key certificate, which is used to verify the entity and ensures the identity of the organization or person receiving any data sent.

Limitations of HTTP:

- The protection afforded by https is dependent on proper web browser implementation, server software used, and supported algorithms. Other than man-in-the-middle attacks and eavesdropping, https provides no protection whatsoever.
- In addition, any information sent is only as secure as the server it is sent to and if any of the above is not being implemented correctly information can be siphoned off.

Most casual internet users understand that when they see https at the front of a URL it is affording them some sort of protection, and they may even know that it indicates a secure connection. In general it is good advice to avoid entering any sensitive information on sites that do not use an https address.

Difference between S-HTTP and SSL

Main difference between SSL and HTTPS is that SSL is a cryptographic protocol, while HTTPS is protocol created combining HTTP and SSL. But, sometimes, HTTPS is not identified as a protocol per se, but a mechanism that merely uses HTTP over encrypted SSL connections. In other words, HTTPS uses SSL to create a secure HTTP connection. Because of encryption provided by SSL, HTTPS is able to withstand eavesdropping(secretly listen to a conversation) and man-in-the middle attacks.

SSL (Secure Socket Layer) or TLS (Transport Layer Security) works on top of the transport layer, in your examples TCP. TLS can be used for more or less any protocol, HTTPS is just one common instance of it.

HTTP is an application layer protocol.

In regular, non-encrypted HTTP, the protocol stack can look like this:

- HTTP
- TCP
- IP
- Ethernet

When using HTTPS, the stack looks like this:

- HTTP
- TSL (SSL)
- TCP
- IP
- Ethernet