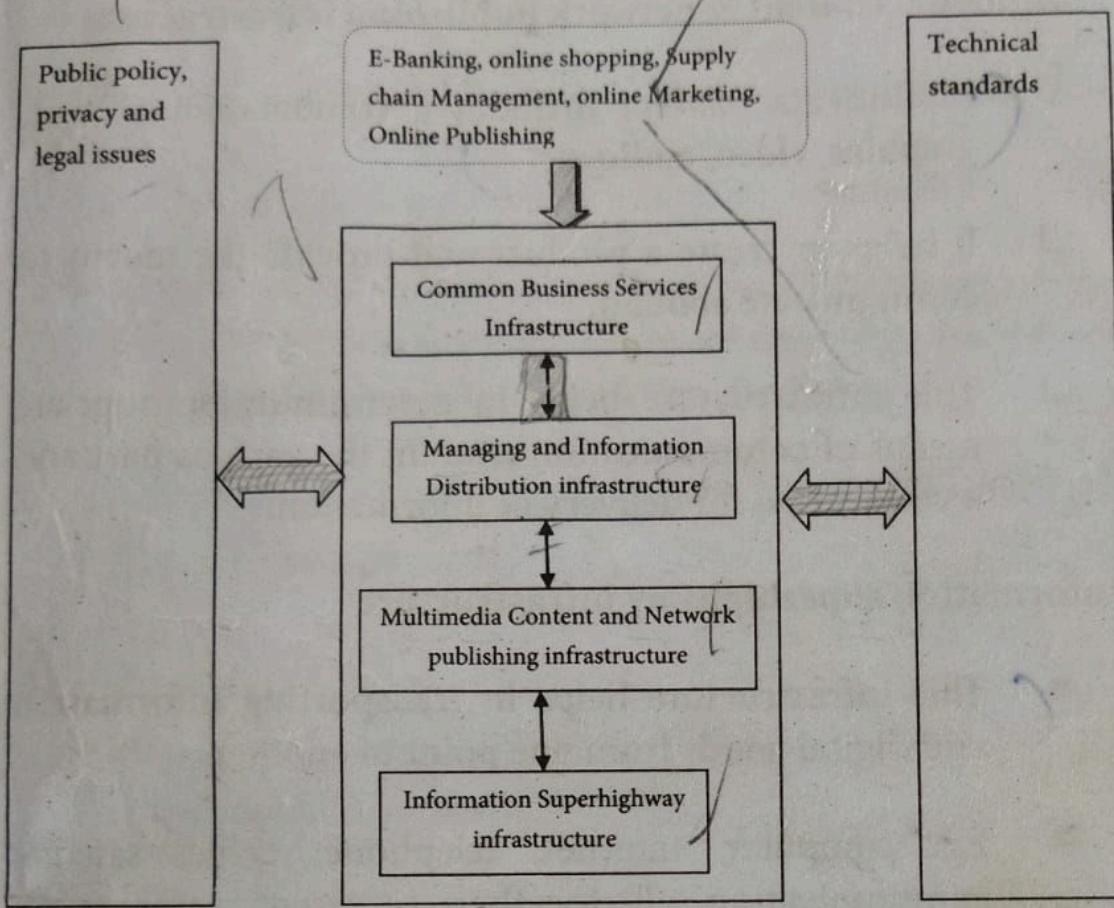


1.2 E-COMMERCE FRAMEWORK



S. Krishnamoorthy

Common Business services infrastructure

- ☞ This infrastructure enables buying and selling of goods in electronic environment.
- ☞ This infrastructure includes electronic catalog, electronic payment, encryption and other e-securities involved in a transaction.
- ☞ Encryption ensures that the transaction are carried out safety.

Managing and information distribution infrastructure

- This infrastructure helps in sending and retrieving information.

1.8

- It supports a variety of software like e-mail, fax, EDI etc.

Multimedia content & network publishing infrastructure

- Multimedia content includes a combination of text, graphics, video, audio etc.
- It helps to create a product and provide the means to communicate about it.
- This infrastructure helps in determining appropriate means of communication among the various parts and a verification for delivery of information.

Information superhighway infrastructure

- This infrastructure helps in transporting information and digital goods from one point to another.
- Eg: computer, internet, telephone, cable, satellite communication all together represent information super highway.
- The two pillars that support e-commerce application in information superhighway are.
 1. Public policy privacy and legal issues.
 2. Technical standards.

Public policy, privacy and legal issues

- They govern rules like universal access and privacy.
- Such issues support encryption and decryption mechanism for safe transfer of information in super highway.
- It protects the consumer from fraud.

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3. Time Accessibility

- Business is open only for a limited time in traditional.
- Round the clock(24*7) services is available in e-commerce.

4. Customer interaction

- ✓ In traditional commerce the interaction between the business and the consumer is face to face.
- ✓ In electronic commerce the interaction between the business and the consumer is screen to face.

5. Introduction of new products

- In traditional commerce it takes a lot of time and money to introduce a new product and analyze the response of the customers.
- In e-commerce it is easy to introduce a product on the website and get the immediate feedback of the customers.

6. Fraud

- Lot of sites cyber frauds take place in electronic commerce transactions. People generally fear to give credit card information.
- Fraud in traditional commerce is comparatively less as there is personal interaction between buyer and seller.

7. Process

- ✓ There is an automated processing of business transaction in e-commerce. It helps to minimize the errors.

Introduction



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- ✓ There is manual processing of business transactions in traditional commerce. There are chances of classical errors to occur as human intervention takes places.

8. Geographical Accessibility

- ☞ In traditional commerce it may be easy to expand the size of the market from regional to national level. Business organizations have to incur of lot of expenses on investment to enter international market.
- ☞ In e-commerce it is easy to expand the size of the market from regional to international level by hosting a website and by placing advertisements on the internet.

9. Convenience

- E-commerce provides convenience to both the customers and business.
- Customers can browse through whole directories of catalogues compares price between the products and choose a desired product at any time anywhere in the world without any necessity to move away from their home or workplace.

10. Product suitability

- E-commerce is not suitable for perishable goods and high valuable items such as jewels and antiques. It is mostly suitable for purchasing tickets books, music and software.
- Traditional commerce is suitable for perishables and touches and feel items. Purchasing software music in traditional commerce may appear expensive.

2. Multimedia server

- E-commerce applications require services store and distributed large amount of digital information to consumers.
- Server act as a warehouse server provide information as and when request by consumers.
- Multimedia servers can handle a variety of content ranging from books, advertisement, movies, games, catalogs etc.

3. Client-server architecture

- E-commerce applications are based on client-server model.

- Client-server model enables the client to communicate with the server.
- Clients are the devices that request information from server.
- Server response to it, it is carried out through a request reply sequence.
- Servers have the ability to add more clients.

4. Network service providers (NSP)

It acts as an access points NSP is actually a business or an organization. These organizations sell bandwidth or network access providing direct backbone access to the internet and usually access to its network access point.

5. Information delivery infrastructure

- This infrastructure helps in distribute of information.

2.2

1. Voice network
2. Data network
3. Video conferencing network

Network infrastructure is capable of supporting multiple types of information.

2.2 COMPONENTS OF THE I-WAY

There are three major components.

It is

1. Network access equipments
2. Local on ramps (or) last mile
3. Global information distribution network.

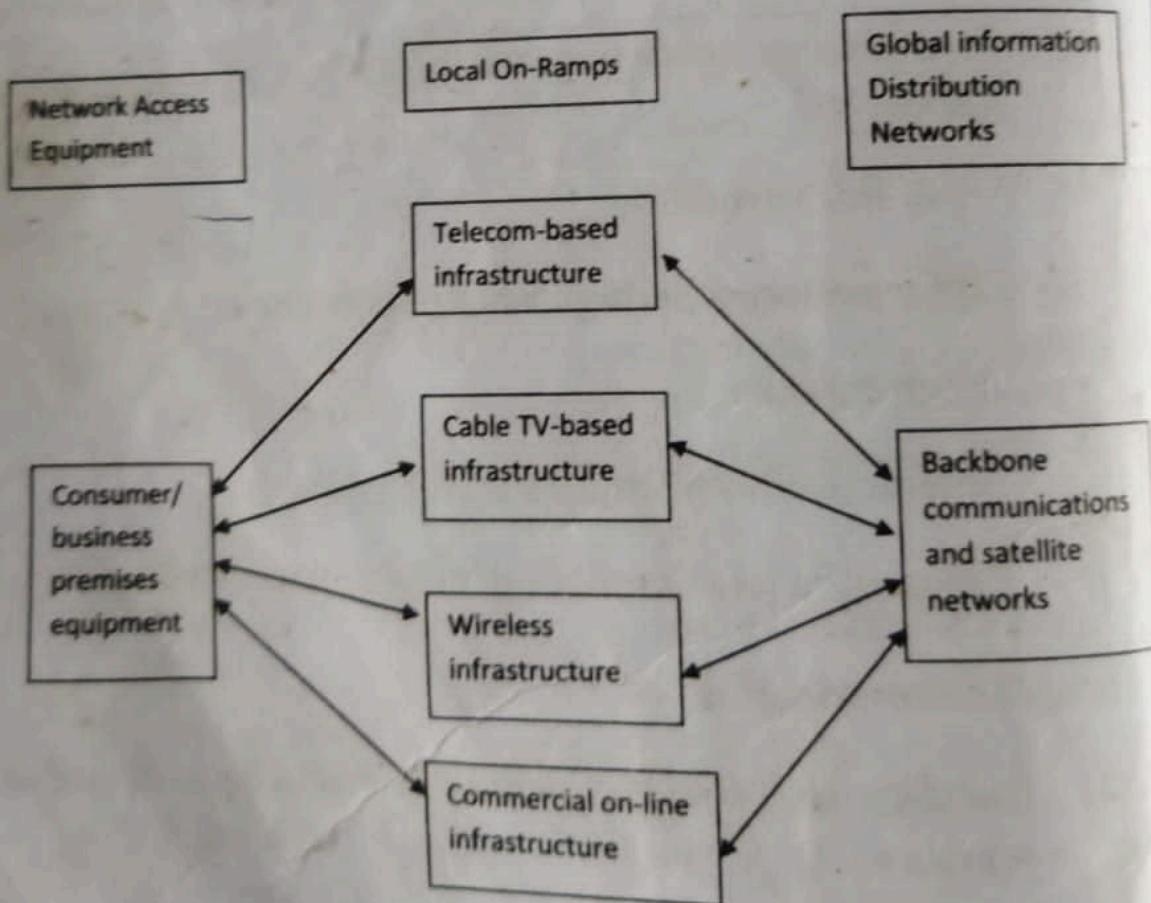


Fig: Components of the Information Superhighway

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4. Commercial online infrastructure

- Online services are a major part of the I-way infrastructure.
- They provide customers with both the e-commerce applications as well as the ramps to access the I-way.
- The big online services, setup before the popularity of global networks, were designed to provide all the goods and information's service once computing platform.
- Their goal is to become the one-stop shopping mall of cyber space.
- With a single telephone call, customer can read or download the news, look up a stock quote, give some advice, make a friend book a flight, check the weather, buy a raincoat, or order a bunch of flower.
- The benefit of the computer based online approach is that services are packaged better and appear less complex than other infrastructure options.

2.2.3 Global Information Distribution Networks

Global information distribution network represent the infrastructure crossing between countries and continents.

The two major technologies support high-speed global information distribution networks are

1. Fiber optic long distance networks

Network I

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3. Inconsistent usage holes result when a system administrator assembles a combination of hardware and software such that the system is seriously flawed from a security point of view. The incompatibility of attempting two unconnected but useful things creates the security hole.

To reduce these security threats, various protection methods are used. At the file level, operating systems typically offer mechanisms such as access control lists that specify the resources various users and groups are entitled to access. Protection – also called authorization or access control grants privileges to the system or resource by checking user-specific information such as passwords.

Over the years, several protection methods have been developed, including *Trust-based security, security through obscurity, password schemes, and biometric systems*.

1. Trust - Based Security

- ⦿ Quite simply, trust - based security means to trust every one and do nothing extra for protection. It is possible not be provide access restrictions of any kind and to assume that all users are trustworthy and competent in their use of the shared network.
- ⦿ This approach worked in the past, when the system administrator had to worry about a limited threat. Today, this is no longer the case.)

2. Security Through Obscurity

- ⦿ Most organizations in the mainframe era practiced a philosophy known as Security Through Obscurity (STO)
- ⦿ STO provides a false sense of security in computing

Threats to message security fall into three categories: confidentiality, integrity, and authentication.

Message Confidentiality

Confidentiality is important for uses involving sensitive data such as credit card numbers.)

The environment must protect all message traffic. After successful delivery to their destination gateways, messages must be removed (expunged) from the public environment.)

Message and System Integrity

Business transactions require that their contents remain unmodified during transports. In other words, information received must have the same content and organizations as information's sent. It must be clear that no one has added, deleted, or modified any part of the message.

Message Sender Authentication/Identification

For e-commerce, it is important that clients authenticate themselves to servers, that servers authenticate to clients, that both authenticate to each others.

Encryption As The Basis For Data And Message Security

Encrypt, or encipher, the message, which means that Anne can scramble it in a hopelessly complicated way, rendering it unreadable to anyone except you, the intended recipient.

Secret-Key Cryptography

Secret-key cryptography involves the use of a shared key for both encryption by the transmitter and decryption by the receiver. Shared-key techniques suffer from the problem of

3.12

firewall in place, the administrator who has the responsibility of designing, specifying, and implementing or overseeing the installation of a firewall must address a numbers of management issues.

3.5 DATA AND MESSAGE SECURITY

Data and Message Security

The lack of data and messages security on the Internet has become a higher profile problem due to increasing number of merchants trying to spur commerce on the global network.

For instance, credit card numbers in their plain text form create a risk when transmitted across the Internet where the possibility of the number falling into the wrong hands is relatively high.)

Would you be willing to type in your credit card number knowing the risk? Even worse, would you expose your customers to that risk? Just the thought of "sniffer" programs that collect credit card numbers en masse is enough to keep merchants away from on-line shopping given the possible lawsuits and other liability issues. In short, the lack of business transaction security is widely acknowledged as a major implement to widespread e-commerce.

The lack of data and message security on the Internet has become a high profile problem due to the increasing number of merchants trying to spur commerce on the global network.

Data Security

(Electronic data security is of paramount importance at a time when people are considering banking and other financial transactions by PCs.) Also, Computer industry trends toward distributed computed computing, and nomadic or mobile computer users, only exacerbate security challenges.

3.2 Client-server security: methods to make sure that only valid users and programs have access to information resources such as databases. Such mechanisms include pass-word protection, encrypted smart cards, biometrics, and firewalls.

- 2 **Data and transaction security:** ensures the privacy and confidentiality in electronic messages and data packets, including the authentication of remote users in network transaction for activities such as on-line payments.

3.2 CLIENT-SERVER NETWORK SECURITY

Client-server network security is one of the biggest headaches system admin-iterators face as they balance the opposing goals of user maneuverability and easy access and site security and confidentiality of local information.

Network security on the internet is a major concern for commercial organizations, especially top management.

Client-server network security problems manifest themselves in three ways:

1. **Physical security holes** result when individuals gain unauthorized physical access to a computer.)

(On the network, this is also a common problem, as hackers gain access to network systems by guessing by passwords of various users.)

2. **Software security holes** result when badly written programs "privy-legged" software are "compromised" into doing this they shouldn't.

(This is the highest level of access) possible and could be used to delete the entire file system, or create a new account or password file resulting in incalculable damage.

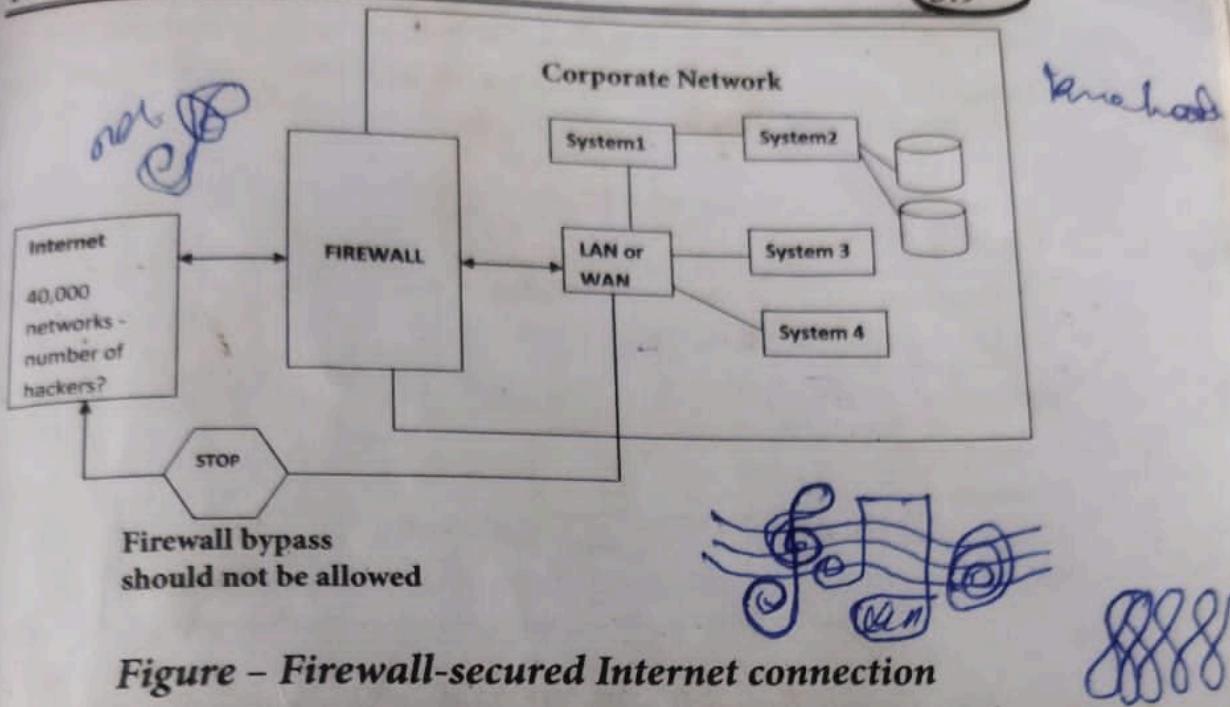


Figure - Firewall-secured Internet connection

Firewalls In Practice



Firewalls range from simple traffic logging systems that record all network traffic flowing through the firewall in a file or database for auditing purposes to more complex methods such as IP packet screening routers, hardened firewall hosts, and proxy application gateways.

The simplest firewall is a packet-filtering gateway or screening router.

IP Packet Screening Routers

This is a static traffic routing service placed between the network service provider's router and the internal network. The traffic routing service may be implemented at an IP level via screening rules in a router or at an application layer via proxy gateways and services.

(The firewall router filters incoming packets to permit or deny IP packets based on several screening rules.)

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A firewall typically establishes a barrier between a trusted, secure internal network and another outside network, such as the Internet, that is assumed to not be secure or trusted.

Firewalls are often categorized as either network firewalls or host-based firewalls. Network firewalls are a software appliance running on general purpose hardware or hardware-based firewall computer appliances that filter traffic between two or more networks.

Host-based firewalls provide a layer of software on one host that controls network traffic in and out of that single machine.

Routers that pass data between networks contain firewall components and can often perform basic routing functions as well. Firewall appliances may also offer other functionality to the internal network they protect such as acting as a DHCP or VPN server for that network.

- ☞ The most commonly accepted network protection is a barrier - a firewall - between the corporate network and the outside world (untrusted network).
- ☞ The term firewall can mean many things to many people, but basically it is a method of placing a device - a computer or a router - between the network and the Internet to control and monitor all traffic between the outside world and the local network.

Generally speaking, a firewall is a protection device to shield vulnerable areas from some form of danger. In the context of the Internet, a firewall is a system - a router, a personal computer or a collection of hosts - set up specifically to shield a site or subnet from protocols and services that can be abused from hosts on the outside of the subnet.

Hackers can use popular UNIX Programs like Finger, rsh, or user to discover account names and then try to guess simple passwords using a dictionary or more sophisticated password guessing methods (e.g., a hacker could use a password guessing program in which multiple computer systems are used simultaneously for comparison purpose).

Hackers can use electronic eavesdropping to trap user names and unencrypted passwords sent over the network. They can monitor the activity on a system continuously and impersonate a user when the impersonation attack is likely to be detected.

Hackers can spoof, or configure, a system to masquerade as another systems, thus gaining unauthorized access to resources or information on systems that "trust" the systems being mimicked.

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3.4 NETWORK SECURITY AND FIREWALLS

A *firewall* is a network security system that monitors and controls the incoming and outgoing network traffic based on predetermined security rules.

ii. Port number 80 is for WWW.

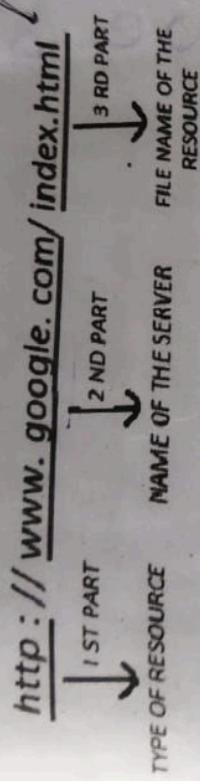
4.7

(b) Uniform Resource Locators (URL)

URL provides a uniform way of identifying resources that are available using internet protocols.

It is broken down into two or more parts separated by periods.

For example,



(c) Domain Name System (DNS)

Every computer on the internet has unique address called IP address.

The DNS makes it easier by allowing a familiar string of letters to be used instead of IP address.

The DNS is divided into two categories :

1. *Generic Top level domain*

- com → commercial enterprises
- org → non-profit organisations
- net → networks
- edu → education

12^o Documents traded or planned

13^o Degree of integration of EDI into their applications.

8. Decide on EDI Translation Software

Translation is an integral part of the overall of EDI solution. If EDI is done without translation, companies run a great risk of transmitting data that trading partners may not be able to read.

9. Decide On EDI Integration Provider and a Network Provider

Choose right providers for the systems requirements. EDI integration with other back-office systems can improve organization's total internal business processes, efficiency and save money.

10. Review Data Contained in the Documents to be Exchanged

A review of the data to be transmitted and received is essential to ensure that integration will proceed normally.

11. Code and Test Interface

The maximum benefit of EDI is derived from integration of information so that information can flow directly in/out of systems without human intervention.

12. Conduct System Testing

Most companies conduct parallel testing with EDI and paper documents until they are sure that the information received meets their needs.

1. Product flow
2. Information flow
3. Financial flow

The product flow include the movement of goods from a supplier to a customer, and also any goods returned by customer .The information flow involves transmitting orders and updating the status of delivery .The financial flow consists of credit terms, payment schedules, consignment and title ownership arrangements.

Advantages of supply chain management

1. It reduces paperwork, administrative overheads, inventory buildup and the number of hands the handle goods on their way to the end-user (customer)
2. It reduces cost
3. It improves efficiency
4. Minimized delay

Disadvantages of supply chain management

The biggest disadvantages of supply chain management is the heavy investment of time,money and resources needed to implement and overlook the supply chain

Reverse Supply Chain Reverse logistics is the process of planning, implementing and controlling the efficient, effective inbound flow and storage of secondary goods and related information opposite to the traditional supply chain direction for the purpose of recovering .

Supply Chain Management spans all movement and storage of raw materials, work-in-process inventory, and finished goods from point-of-origin to point-of-consumption.

Supply Chain Management can also refer to supply chain management software which is tools or modules used in executing supply chain transactions, managing supplier relationships and controlling associated business processes.

The Management Components of SCM

The literature on business process re-engineering, buyer-supplier relationships and SCM suggests various possible components that must receive managerial attention when managing supply relationships.

Lambert and Cooper (2000) identified the following components which are:

- Planning and control
- Work structure
- Organization structure
- Product flow facility structure
- Information flow facility structure
- Management methods
- Power and leadership structure
- Risk and reward structure
- Culture and attitude

Supply chain management flows can be divided into three main activities

Intraorganizational Electronic Commerce supply chain management. Electronic Commerce catalogs, Document Management and digital libraries.

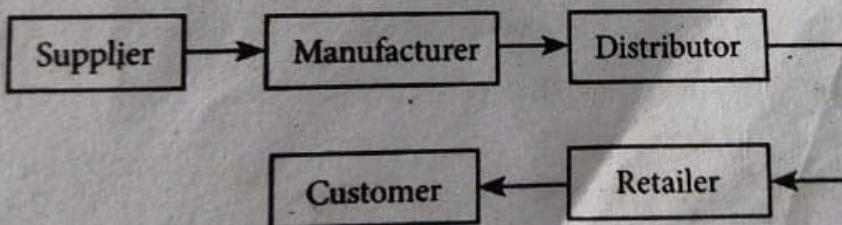
5.1 INTRODUCTION

Internal commerce is the application of electronic commerce to processes or operations.

Specifically, we define internal commerce as using methods and pertinent technologies for supporting internal business processes between individuals, departments, and collaborating organizations.

What is Supply chain?

Consists of all parties involved, directly or indirectly in fulfilling a customer request.



5.2 SUPPLY CHAIN MANAGEMENT (SCM)

Supply chain management (SCM) is the management of a network of interconnected business involved in the ultimate provision of product and service packages required by end customers.

13. Implementation

It should support IT capabilities and business needs of the organization. EDI implementation strategy must enable smooth flow both internally and with valuable trading partners.

EDI mapping documents must be created with application layer and promotes transmission efficiency across the network with other layers.

14. Training

The staff involved in EDI project must be well informed about the plans of the organization. They must be given training in EDI application and procedure that support the application.

15. Post Implementation Review

Review the results after six months to determine if the planned benefits/costs meet the actual benefits/costs.

Bansal

Ramgopal

Dwivedi

- It protects the right of consumer.

Technical standards

- Technical standards are very important in e-commerce.
- They dictate the nature of information publishing.
- They provide standards for accessing information on any type of devices like personal computer (pc), laser disk, portable computer devices (laptop) etc.

1.2.1 Difference between Traditional Vs Electronic business applications

1. Cost

- E-commerce is very effective when compared to traditional commerce.

In traditional commerce cost has to be incurred for the role of middle man to sell the company products.

The cost incurred on middle man is eliminated in e-commerce as there is a direct link between the business and the customer.

To reduce cost in e-commerce.

Yogesh.

2. Time

It takes a lot of time to complete a transaction in traditional commerce.

E-commerce serves a lot of valuable time for both customers and business.

A product can be ordered and transaction can be completed in few minutes through internet.

1.12 11. Physical inspection

- E-commerce doesn't allow physical inspection of goods.
In purchasing goods in e-commerce customers have to rely on electronic images
- Whereas in traditional commerce it is possible to physically inspect the goods before purchase.

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1.3 ANATOMY OF E-COMMERCE

1. Multimedia content.
2. Multimedia server.
3. Client-server architecture
4. Network service provider
5. Information delivery information
6. Video server
7. Consumer devices.

1. Multimedia content

- ✓ It refers to usage of digital data in more than one format.
- ✓ It is a combination of text, audio, video, graphics in a computer file.
- ✓ The success of e-commerce application depends heavily on the innovation of multimedia content.
- ✓ Multimedia content act as both the fuel and traffic for e-commerce application.

multimedia is associated with
hard user component of digital

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- The transport providers play an important role in transportation of information.
- The transport providers consist of cable wireless industries, telecommunication, commerce networks and public networks such as internet
- More than 60% of e-commerce applied is carried out through online.

6. Video server *E-commerce*

- Video servers deliver information to several consumers simultaneously through cable networks and telecommunication.
- Videos servers act as an link between content providers and transport provides
- Entertainment produces (cartoons , gaming movies and videos etc) and media industries are some of the content providers.
- Cable operators, telecommunication companies, wireless industries are some of the transport providers.

7. Consumer devices

- Some of the consumer devices that provide access to information are telephones, laptop, personal computer, video phones, desktop computer, television sets etc.
- Computer can handle multiple task and very popular today.
- There devices help to provide information to users in e-commerce environment.



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NETWORK INFRASTRUCTURE E-COMMERCE

Network infrastructure for E-Commerce - components of the I-way - Global information distribution networks - public policy issues shaping the I-way. The internet as a network infrastructure. The Business of the internet commercialization.

2.1 THE NETWORK INFRASTRUCTURE FOR E-COMMERCE

- ☞ E-commerce needs network infrastructure to transport the content.
- ☞ I-way infrastructure:
 - Information superhighway infrastructure
 - High capacity
 - Interactive Between uses server and user.
 - Supports a large number of e-commerce application.

Existing communication

- Inability to provide integrated voice data & video services.
- Separate voices network & data network

2.1.1 Types of network

There are three separates networks,

2.2.1 Network Access Equipments

- 3D
- Customer premises equipments (CPE) is privately owned communication equipments (i.e.) attached to the network.
 - It may be divided into three parts,
 - a. Set top boxes.
 - b. Computer based telephoning
 - c. Digital switches, routers and hubs

a. Set top boxes

- It is one of the key hardware platforms for I-way access.
- The set top box will act as a gate way for information services, commercial transactions and digitally compressed channels.
- These boxes will enable the users to make phone calls and to set the internet etc.

S. Krishnamoorthy
BCA II
Year.

b. Computer based telephones

- Private branch exchanges, telephones, modems, voice processing equipments, video processing equipment are the largest CPE product sectors.
- CPE products help to improve the business by reducing expenses on communication and transportation.
- Software interface helps to transfer data video, images, voice message through telephone switches more effectively.

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c. Digital switches, router & hubs

- ⇒ Digital data are passed through switch that route them to the intended destination routers.
- ⇒ Routers are internetworking devices they connect LANs and WANs of various provide hubs.
- ⇒ Hubs act as a waiting center for large LANs.
manage traffic flow
- ⇒ They can measure and manage traffic flow.

2.2.2 Local on ramps (or) last mile

It is also called as last mile. Local on ramps helps to simplify the linkages between organizations and home for the communication backbone. *Telephone cable*

One of the key forces shaping the dynamics of the I-way infrastructure is the "last mile" waiting linking homes with the backbone.

There are four types of local on ramps. They are,

1. Telecom-based infrastructure
2. Cable TV-based infrastructure
3. Wireless infrastructure
4. Commercial – online infrastructure

The "last mile" connections represent a tremendous "sunken" investment that cannot be easily replaced or overlooked in any network strategy.

1. Telecom-based infrastructure

Although the industry is rapidly introducing advanced

digital communication technologies, the telephone network continues to be dependent on analog transmission.

Much of today's telephone service is based on two analog-oriented transmission technologies.

- a. The analog voice frequency (VF) system
- b. The digital T-carrier system.

a. The analog voice frequency (VF) system

It supports voice transmission over pair of copper wires - also known as the local loop - connecting millions of residential and business subscribers with the local telephone company's central office.

b. The digital T-carrier system

It plays a major role in the final step in the transmission from analog to digital capabilities.

2. Cable TV-based infrastructure

The second major contender in the last mile provider, battle, cable, is vigorously pushing the concept that high speed data to the home is served by running over cable networks not on telephone analog and more recent ISDN connection.

Cable companies have the high capacity wiring in the form of co-axial cable for broadcasting analog video.

They are classified into two categories.

- i. Wired cable TV
- ii. Wireless cable TV

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i. Wired cable TV

The cable television network links thousands of cable systems with millions of subscribers via broadband co-axial cable.

The cable systems are based on a tree and branch network architecture and proprietary transmission protocols designed to support one way broadband analog transmission with little or no provision "upstream" communications.

Three phases of cable strategy

Phase 1: 1994-1996

Digital compression and fiber deployment expand channel capacity from 60 channels.

Phase 2: 1996-1998

Interactivity advances between subscribers and head end.

Phase 3: 1998-2000

Cable becomes a fully implements interactive national digital networks, subscriber to subscriber communications available.

ii. Wireless cable TV

- Direct Broadcast Satellite (DBS) is just starting to move into the collective consciousness of the big players as potential threats.
- DBS uses Super High Frequency (SHF) channels to transmit satellite cable programming over the air instead of through overhead or underground wires.

Network Infrastructure

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■ MMDS is (Multipoint send one

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4. Commercial online infrastructure

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- Their goal is to become the one-stop shopping mall of cyber space.
- With a single telephone call, customer can read or download the news, look up a stock quote, give some advice, make a friend book a flight, check the weather, buy a raincoat, or order a bunch of flower.
- The benefit of the computer based online approach is that services are packaged better and appear less complex than other infrastructure options.

2.2.3 Global Information Distribution Networks

Global information distribution network represent the infrastructure crossing between countries and continents.

The two major technologies support high-speed global information distribution networks are

1. Fiber optic long distance networks
2. Satellites networks

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1. Fiber optic long distance networks

Long distance connectivity is available through cable (co-axial or fibre) owned by long distance or inter exchange carriers. Fiber was used in U.S.A for long distance infrastructure. The advantages of using fiber optic cable is as follows:

- (a) Lighter and smaller enabling quicker deployment.
- (b) Higher bandwidth for increasing throughput
- (c) Less expensive
- (d) Better quality-safe from electromagnetic interference from any source.
- (e) These cables are now laid undersea to carry international traffic
- (f) Cable providers provide better quality service for interactive applications
- (g) Long distance carriers have focused their attention on wireless technologies
- (h) This will help them provide services to cellular users

2. Satellite networks

- Satellites can provide services to areas that cannot be reached by fiber.
- Satellite networks are better than terrestrial networks because they are accessible from any place in the globe.
- They can provide broadband digital switch.
- The communication satellites provide wide range of services including broadcast video and overseas telephone lines.

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- Today, very small aperture terminal satellite networks are used by large corporate houses to link hundreds of retail sites.

2.3 PUBLIC POLICY ISSUES SHAPING THE I-WAY

The public policy issues shaping the I-way are discussed below:

1. Cost

The cost of constructing and maintaining information superhighway is very expensive.

It raises issues like whether the government or private sector would construct I-way.

2. Subsidies

Developers of the I-way look for subsidies concessions and tax holidays from the government.

If the subsidies are given the information distribution services can be provided as subsidized rates.

Providing and extending the network to nonprofit organizations raise monetary issues.

3. Allocation of scarce resources

The construction of I-way requires allocation of scarce resources.

Some economics feel that there is evades to suggest a demand for the services offered by I-way.

If there is no demand, then the allocation of scarce resources towards the constructions of I-way would result in futile.

Network Infrastructure

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4. Regulation

There are also issues regarding who would frame enforce the rules for regulating the functioning of the I-way such as whether it would be regulated by the government or private sector.

5. Universal access

The I-way should be accessible by all. Even poor citizen must be able to afford money to buy information.

The information distribution networks must reach even the remote areas.

6. Privacy

- Privacy of the users is very important.
- Certain private information like marital status, income, bank, transactions must not be accessible by all the members.
- If the private information's is accessible by then it would disturb the privacy of the users.

7. Social and religious barriers

- Internet providers space for people to represent their views freely.
- But the social and religious environment vary from country to country.
- The laws also differ from country to country.
- If people can freely express views may cause social and religious conflicts.

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2.4 THE INTERNET AS A NETWORK INFRASTRUCTURE

- ☞ The internet is the most well-known component of the information superhighway network infrastructure
- ☞ The internet (interconnected networks) is an information distribution system spanning several continents.
- ☞ It's very general infrastructure targets not only one electronic commerce application such as video on-demand or home shopping but a wide range of computer-based services such as e-mail, EDI, information publishing, information retrieval and video conferencing
- ☞ The internet environment is a unique combination of postal services, telephone system, research library, super market and talk show that enables people to share and purchase information

The internet terminology

- ★ The internet is a mesh that envelops thousands of interconnected networks linking approximately 4 million computers world wide.)
- ★ It is estimated that every thirty minutes a major network links into the internet.
- ★ These networks belongs to several domains universities, government institutions, large and small entrepreneurial start-ups.
- ★ The interconnected private computers include stand-alone computer like.
 - a) LANS - Local Area Networks (networks whose span is limited to one building)

Network Infras

b)

c)

The internet c

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I-way

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library

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3. The file containing the document is sent electronically on the network.
4. The trading partner receives the file.
5. An acknowledgement document is generated and sent it back.]

The documents must be converted into EDI standard forms with few steps:

- ☞ Interested person must meet and determine the application in the EDI standard.
- ☞ Must concern about translation and reverse translation of data.
- ☞ Ensure agreed standard format from both the sides.

EDI Components

The three important components are as follows,

- (i) ***Application service:*** Enables the means of integration.
- (ii) ***Translation service:*** Enables the means of conversion.
- (iii) ***Communication service:*** Enables the means of transformation.

Benefits of EDI

- a) Convenience
- b) Fast and Adequate information
- c) Reduce cost
- d) Accurate process

b) MANS - Metropolitan Area Networks(network that span an area up to 1 square miles)

c) WANS- Wide Area Networks(networks that cover large geographic distances)

The internet can be classified into two types. They are,

- a. Academic internet
- b. Business internet

a. Academic internet

- ★ In the academic internet also known as the literature as core internet.
- ★ All the host computers speak the language. Transport control protocol/internet protocol(TCP/IP).

b. Business internet

In the business internet the host computers can speak a variety of languages other than TCP/IP, including ISO/OSI X-25 - based packet switching networks (popular in Europe and with telecoms), SNA -based BITNET (now defunct, was once popular with university and other- value-added network providers who use IBM mainframes) and other languages for networks run by such commercial provide as CompuServe, prodigy and America online; food apple link, mantel and UUCP networks.

I-way (information Supper hiway)

It Stands for information Supper hiway, hi term we the describ the internet. It is also called digital

E-Commerce

2.14

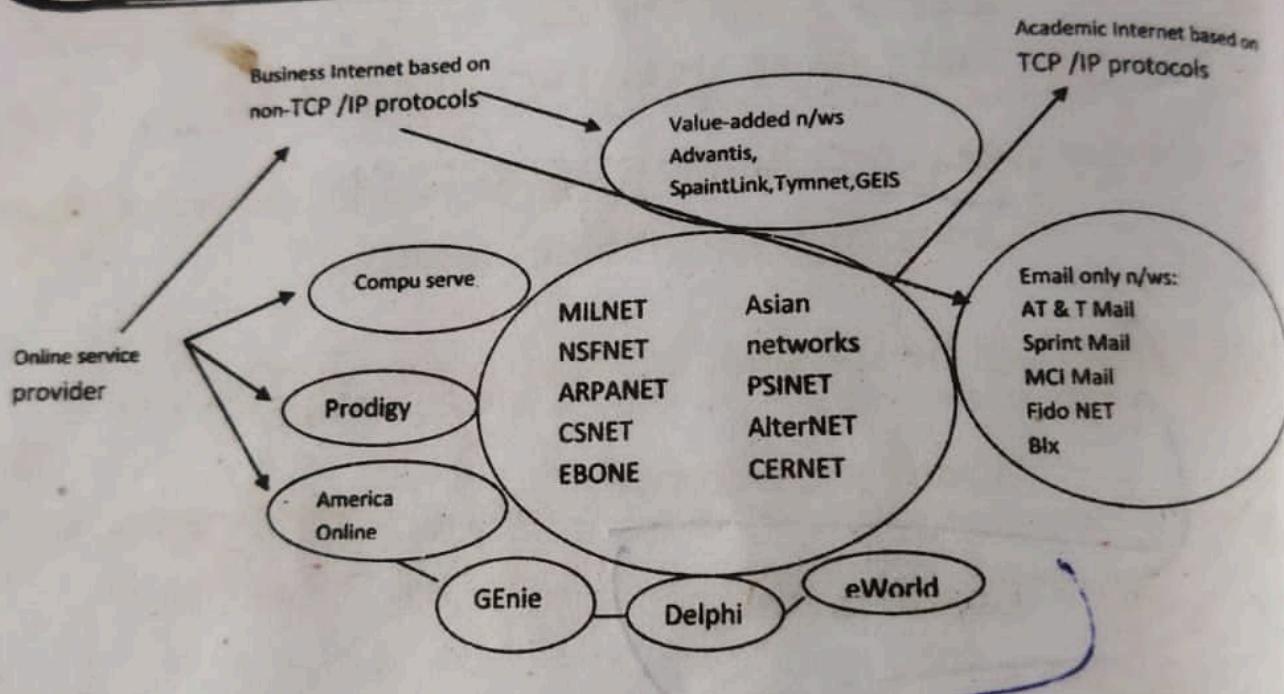


Fig: Network making up the Internet

2.4.1 History of internet

1960's

- In 1969, the department of defense and advanced research project agency (ARPA) creates experimental network called ARPANET.

- DBS is a name given to a service that is called Multichannel Multipoint Distribution Services (MMDS)

- MMDS is a fairly new service that evolved from MDS (Multipoint distribution services) which could only send one or two channels.

- DBS offers two benefits to the customer

Availability *Availab*

Affordability

- Currently two types of DBS wireless cable are available:

Prime star and direct satellite system

Hughes directs TV.

3. Wireless infrastructure

- Radio-based wireless networks made up of cellular, microwave and specialized mobile radio data networks represent an important piece of the last mile puzzle.
- The cellular and satellite networks have advantages over terrestrial (wired) networks because they are potentially accessible from any point on the globe without the cost of installing wire or a cable.
- These systems provide users with an unprecedented degree of mobility and flexibility.
- Radio technology has been around for long time having first been developed on an experimental basis late in the last century.
- However the technology uses crude by modern standards relatively expensive.

If electronic mail systems are to replace the existing paper mail system for business transactions, "signing" an electronic message must be possible.

The recipient of a signed message has proof that the message originated from the sender. This quality is stronger than mere authentication. This quality is can verify that the message came from the recipient recipient can convince a "judge" that the signer sent the message.

To do so, he must convince the judge that he did not forge the signed message himself! In an authentication problem the recipient does not worry about this possibility, since he only wants to satisfy himself that the message came from the sender.

A glance at the header area of any e-mail message, by contrast, will show that it has passed through a number of nodes on its way to you. Every one of these nodes presents the opportunity for snooping.

Advantages

No can figure out the private key from the corresponding public key. Hence, the key management problems is mostly confined to the management of private keys. The need for sender and receiver to share secret information over public channels is completely eliminated.

E-mail users who desire confidentiality and sender authentication are using encryption. Encryption is simply intended to keep personal thoughts personal.

E-mail us typically encrypted for the reason that all network correspondence is open for eavesdropping. A glance at the header area of any e-mail message, by contrast, will show that it has passed through a number of nodes on its way to you.

4.6 HYPERMEDIA is a term used for hyper text.

4.7 TCP IP (Transmission Control Protocol/Internet Protocol) is a set of protocols that handles data transmission.

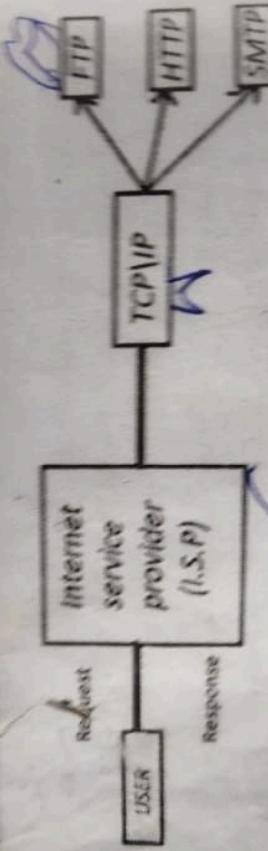
It is made up of three protocols as follows:

i. **Hypertext Transfer Protocol (HTTP)** = used for sending and receiving web pages.

ii. **File Transfer Protocol (FTP)** = used for transferring any kind of file, like doc, bmp, jpeg.

iii. **Simple Mail Transfer Protocol (SMTP)** = used for transferring mail messages.

TCP breaks data into little packets and sent to the destination computer. IP is used to pass the packets from one host to another.



Technology behind the Web:

(a) Ports

They are numbers and standard port numbers are used throughout the internet.

For example,

- Port number 21 is for FTP.

3.14

key distribution, since shared keys must be securely distributed to each pair of communicating parties. Secure-key distribution becomes cumbersome in large networks.

Data Encryption Standard (DES)

A widely-adopted implementation of secret-key cryptography is Data Encryption Standard (DES).

Public-Key Cryptography

- ☞ A cryptographic system that uses two keys- a public key known to everyone and a private or secret key known only to the recipient of the message.
- ☞ An important element to the public key system is that the public and private keys are related in such a way that only the public key can be used to encrypt messages and only the corresponding private key can be used to decrypt them. Moreover, it is virtually impossible to deduce the private key if you know the public key.
- ☞ A more powerful form of cryptography involves the use of public keys.
- ☞ Public-key techniques involve a pair of keys; a private key and a public key associated with each user. Information encrypted by the private key can be decrypted only using the corresponding public key.
- ☞ The private-key used to encrypt transmitted information by the user, is kept secret.

RSA and Public-Key Cryptography

RSA is a public-key cryptosystem for both encryption and authentication developed in 1977. RSA's system uses a matched pair of encryption and decryption keys, each performing a one-way transformation of the data.

iii. Distributed object (document) management and services.

4.5

4.2 WORLD WIDE WEB (WWW/W3) AS THE ARCHITECTURE *lomack*

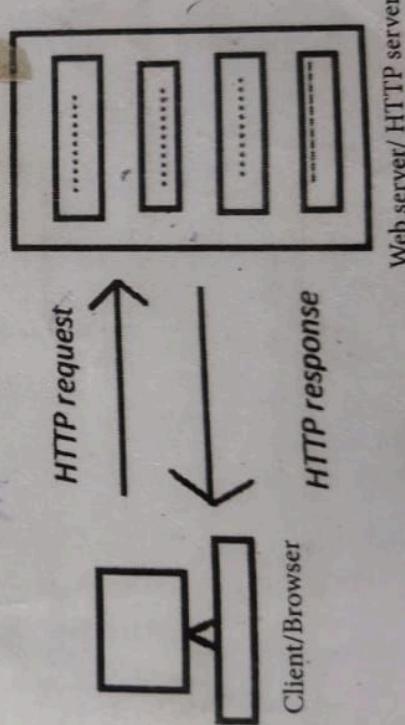
Technically and commercially, the WWW client server seems to become a dominant technology.

The architecture is made up of three primary entities;

1. Client browser (Mosaic \ WWW browser)
2. Web server (Data transaction management , Secure messaging)
3. Third party services (Digital library, Electronic Payment servers)

Web background: Hypertext Publishing

Web servers (receives request) and the Web browser (software helps to connect the source computer) communicate via the Hypertext Transfer Protocol (HTTP).



HYPERTEXT is the text, which contains links to other texts.

3.18 Every one of these nodes presents the opportunity for snooping. Everyday communication over phone and fax lines entails security risks.

Electronic data security is important at a time when people are considering banking and other financial transaction by PCs.

E-mail software is increasingly incorporating specific options that simplify encryption and decryption. Examination of encrypted information is non-trivial; each file must be decrypted even before it can be examined.

If the file itself proves to contain embedded, compressed, encrypted files, those too must be expanded and decrypted.

This process may need repeating several times before the innermost files contents are discernible. Lets look at two e-mail encryption schemes that are being deployed on the internet.

Privacy Enhanced Mail Standard(PEM)

PEM is the internet privacy enhanced mail standard, designed, proposed, but not yet officially adopted, by the internet activities board to provide secure electronic mail over the internet.

Designed to work with current Internet e-mail formats, PEM includes encryption, authentication, and key management and allows use of both public-key and secret-key cryptosystems.

3.16 Digital signatures are a recent development the need for which has arisen with the proliferation of electronic commerce.

- ☞ A secure digital signature system thus consists to two parts; a method of signing a document such that forgery is infeasible, and a method of verifying that a signature was actually generated by whomever it represents. Furthermore, secure digital signatures cannot be repudiated; that is, the signer of a document cannot later disown it by claiming it was forged.

Digital Signature Standard (DSS)

The digital signature standard specifies a digital signature algorithm (DSA) as part of the U.S. governments capstone project.

3.6 ENCRYPTED DOCUMENTS AND ELECTRONIC MAIL

Encrypted Documents and Electronic Mail: E-mail users who desire confidentiality and sender authentication are using encryption.

Encryption is simply intended to keep personal thoughts personal. Some users are already using Pretty Good Privacy (PGP); others are starting to use Privacy Enhanced Mail (PEM).

Electronic data security is important at a time when people are considering banking and other financial transaction by PCs.

E-mail is typically encrypted for the reason that all network correspondence is open for eavesdropping Internet e-mail is obviously for less secure than the postal systems, where envelopes protect correspondence from casual snooping.

Pretty Good Privacy (PGP)

(3.19)

- Pretty Good privacy (PGP) is an implementation of public-key cryptography based on RSA. It is a free software package developed by Phillip Zimmerman that encrypts e-mail.
 - PGP provides secure encryption of documents and data files that even advanced supercomputers are hard pressed to CRACK.
 - Public key cryptography is computationally very expensive. It takes a lot of computing power to decrypt and encrypt a message.)
 - Therefore, PGP can be done by encrypting your message with a conventional algorithm (the IDEA algorithm), and then use the recipient's public key to encrypt just the IDEA key needed to decrypt the message.)
- The digital signature is then encrypted with RSA using the senders private key, and the result is pretended to the e-mail.

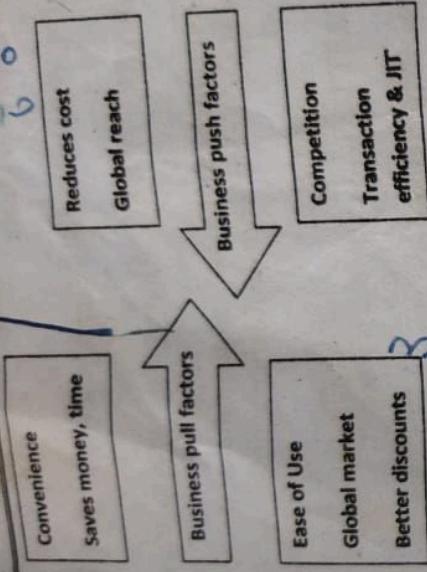
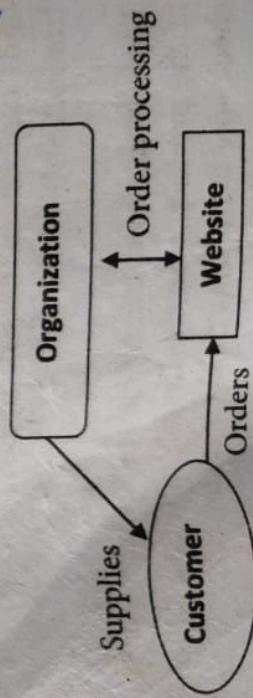


Figure - Push and pull factors of E-commerce

Importance of B2C:

1. **Global Reach:** Internet helps to attract customers from anywhere in the world.
2. **Convenience:** Customers prefer to shop online instead of travelling to a physical store.
3. **Data Collection:** Web enables the merchants to know how many people have visited their websites. The behavior of the customers can be tracked.
4. **Cost effective:** Cost on paper, middlemen, advertisement, labour and order processing are reduced by selling on the web.

Architecture framework for B2C



NARESH
ROBIN

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- .gov → government organisations
- .ac → academic

2. Country code Top level domain

- .au → Australia
- .in → India

(d) Common Gateway Interface (CGI):

- It is a standard for interfacing external applications with information servers such as HTTP or web servers.
- It is a way of programming for the web.
- It is a server-side technology.
- It makes web-pages dynamic.
- Many organizations use CGI for a variety of tasks.
- CGI combines HTML tags with program statements.
- It can be written in almost any programming language.
- CGI scripts communicate with web browsers.

Security and the Web

Exchange of information has three basic properties;

1. Clients are confident about servers.
2. Client conversation is private.
3. Client conversation cannot be interfered.

Categories of Internet Data

4.9

- PUBLIC DATA - can be read by anyone.
- COPYRIGHT DATA - have permission to access.
- CONFIDENTIAL DATA - contain material that is secret but whose existence is not a secret.
- SECRET DATA - existence is a secret.

W3-Based Security Schemes

There are three main categories;

1. Secure Hypertext Transfer Protocol (S-HTTP) → Is a revision of HTTP that enable various cryptographic formats, such as DSA (Digital Signature Algorithm) and RSA (Rivest - Shamir - Adelman) Standards.
2. Security Socket Layer (SSL) → Uses RSA to wrap security information around TCP/IP based protocols.
10m
3. SHEN → Is the security scheme for the web. It is a non-commercial or research based and similar to S-HTTP.

4.3 CONSUMER-ORIENTED ELECTRONIC COMMERCE *10m*

Introduction

- Consumer-oriented electronic commerce is developing and can be witnessed by the growth of online transactions.
- Today, web allows customers to view electronic images of the product, read the description and try sample to check whether it suits their requirements.

- 1. The customer visits the virtual mall. Virtual mall includes a search engine.
- 2. The customer registers on the site shoppers registry.
- 3. The customer negotiates the price with the vendor.
- 4. The customer buys the product through the shopping cart.
- 5. The order that is received from the customer is processed by the merchant.
- 6. The credit card of the customer is authenticated through a payment gateway.
- 7. The product is shipped by the vendor to the customer.
- 8. The customer can track the order and ascertain delivery status.
- 9. The product reaches the customer and is checked by him.

Types of Buyers

- i. **Impulsive Buyer:** Those who buy the product quickly.
- ii. **Patient Buyer:** Those who buy the products after making comparisons.
- iii. **Analytical Buyer:** Those who search for a lot of information before reaching a decision to buy a product.

4.20

- Private label credit/Debit cards (e.g., J.C. Penney Card)
- Charge Cards (e.g., American Express)

(iii) On-line electronic commerce payments

25 1. Token-based payment systems

- Electronic cash (e.g., DigiCash)
- Electronic checks (e.g., NetCheque)
- Smart cards or debit cards (e.g., Mondex Electronic Currency Card))

2. Credit card-based payments systems

- Encrypted Credit Cards (e.g., World Wide Web form-based encryption)
- Third-party authorization numbers (e.g., First Virtual)

4.4.1 Digital Token-Based Electronic Payment Systems

There are three types

Electronic tokens are three types:

1. Cash or Real-time

Transactions are settled with exchange of electronic currency.

- After the order has been fulfilled & delivered, billing is given by finance staff.
- The billing function is designed to serve the needs and interests of the company, not the customer.

Post sales Service

This phase plays an increasingly important role in all elements of a company's profit equation: customer, price & cost (include repair, maintenance).

4.4 ELECTRONIC PAYMENT SYSTEMS

Definitions:

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- E-payments are very essential for completion of transactions.
- EFT is defined as "any transfer of funds initiated through an electronic terminal".
- EFT can be segmented into three broad categories:

(i) Banking and financial payments

- Large-scale or wholesale payments (e.g., bank-to-bank transfer)
- Small-scale or retail payments (e.g., automated teller machines)
- Home banking (e.g., bill payment)

(ii) Retailing payments

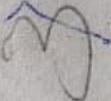
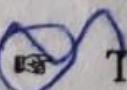
- Credit Cards (e.g., VISA or MasterCard)

4.12**Online Shopping:**

Online shopping methods based on contract, consumption and payment.

- ☞ Consumers pay online and consume online (e.g. Online gaming softwares, music)
- ☞ Consume online and pay offline (e.g. matrimonial ads)
- ☞ Contact and pay online and consume offline (e.g. travel, books, clothes and electronic goods)


Personal Finance and Home Banking Management
Basic Services**Intermediate Services (online payment bill)****Advanced services (finance information)**

Home Shopping
Television-Based Shopping**Catalog-Based Shopping**

3. Home Entertainment
Size of the Home Entertainment Market**Impact of the Home Entertainment on Traditional Industries**

4. Micro transactions of Information
1. Personal Finance and Home Banking Management


The newest technologies are direct deposit of payroll, on-line bill payment

electronically-must be in place.

Pricing: One fundamental issue is how to price payment system services. For e.g., from cash to bank payments, from paper-based to e-cash. The problem is potential waste of resources.

Standards: Without standards, the welding of different payment users into different networks & different systems is impossible.

4.5 ELECTRONIC DATA INTERCHAGE

Definition

(A) 5m

Electronic Data Interchange (EDI) is the interchange of structured business information in standard formats from one computer to another.

Uses

It can be used to transmit

- * Invoice *Invoice*
- * Purchase order
- * Receipt
- * Shipping Document
- * Acknowledgement
- * Other standard forms.

4.28

EDI Layered Architecture

It has four layers,

- i. **EDI Semantic Layer:** Describes about the business application.
- ii. **EDI Standard Layer:** Specify business format.
- iii. **EDI Transport Layer:** Corresponds with the non-electronic activity (parcel service).
- iv. **Physical Layer:** Defines the types of cables and connectors.

EDI Semantic Layer	Application Level Services	
EDI Standard Layer	EDIFACT business form standards	
	ANSI X12 business form standards	
EDI Transport Layer	Electronic Mail	X.435, MIME
	Point to point	FTP, TELNET
	WWW	HTTP
Physical Layer	Dial-up lines, Internet, I-way	

Figure - Layered Architecture of EDI

EDI versus E-mail

EDI --> Software-to-software interface, interpreted only by software.

E-mail --> Human-to-software interface, interpreted only by human.

EDI in Action

There are three ways of process

1. **Translation of business data:** Translates the outbound file from business into EDI format.

2. **Transmission of data:** Transmit document between the trading partners.

3. **Re-translation of data:** Re-translates the inbound file back into business format.

Information flow with and without EDI

The below diagram shows the process of EDI document,

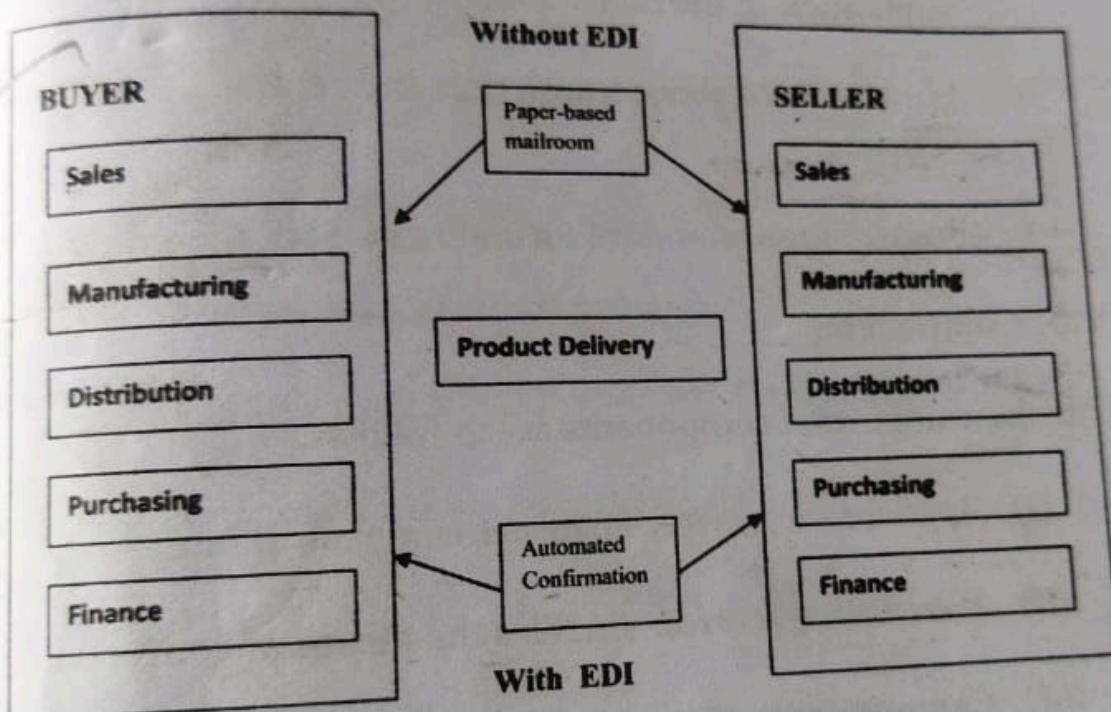


Figure - Information flow with and without EDI

Steps in an EDI system

Following five primary steps in an EDI system are,

1. A program generates a file that contains the processed document.

2. The document is converted into an agreed standard format.

- e) Effective customer service
- f) Eliminate paperwork
- g) Improves cash flow and data flow
- h) Effective information management
- i) Global reach.

4.6 EDI APPLICATIONS IN BUSINESS

The four different scenarios in industries that use EDI extensively are as follows;

1. Roles of EDI in International trade
2. Interbank Electronic Funds Transfer (EFT)
3. Health care EDI for insurance EDI
4. Manufacturing and Retail procurement using EDI.

4.6.1 Role of EDI in International trade

EDI attempts to facilitate the smooth flow of information.

The purpose of the information flow is not merely to provide data but it must timely deliver.

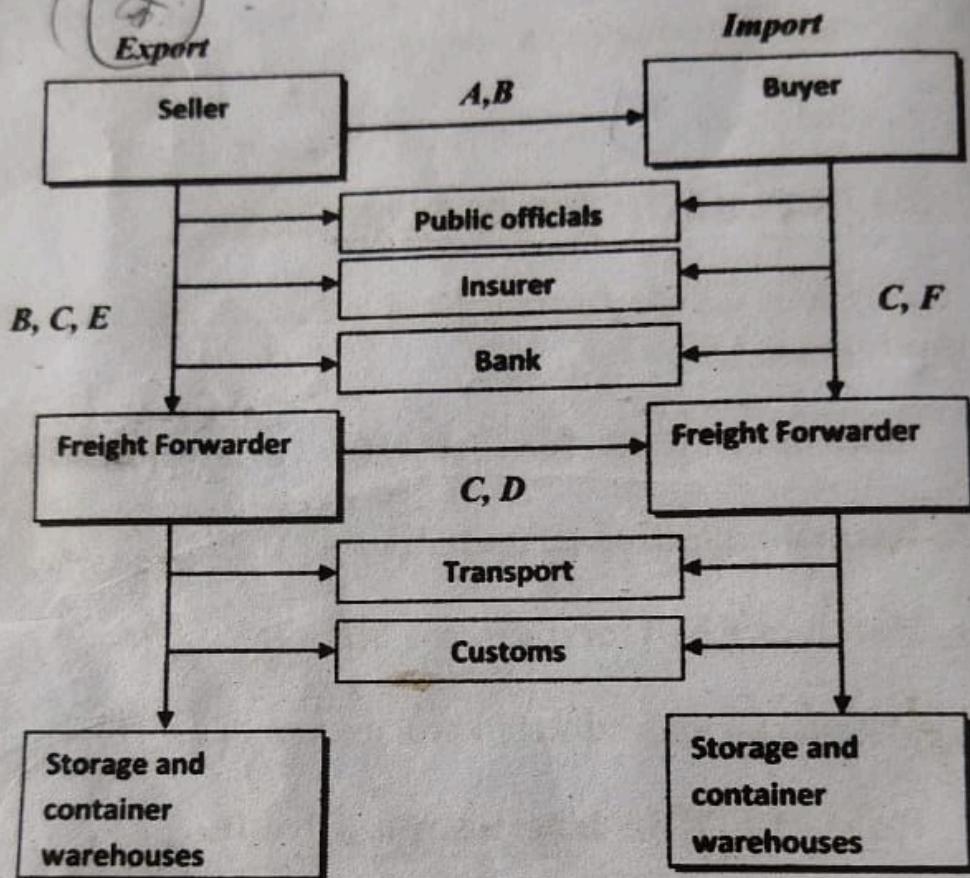
Benefits

- a) Reduced transaction expenditures.
- b) Quicker movement of imported and exported goods.
- c) Improved customer service through "track & trace" programs.

4.32

- d) Faster customs clearance and reduced opportunities for corruption, a huge problem in trade.

Components of International Trade



Diagrammatic parts

- A: Establishment of commercial agreement (commercial)
- B: Arrangement of payment (financial)
- C: Arrangement of transport (transport intermediary)
- D: Arrangement of insurance (insurance)
- E: Clearance of export (customs)
- F: Clearance of import (customs)

- ☞ Mainly concern with the business work flow rather than data.
- ☞ Construct documents with SGML and HTML.
- ☞ Shift the technology from low-level to high-level interchange structure.
- ☞ Allow customization that best suits their local environment.

Open EDI

- ☞ It provides a framework for potential partnership in a short time.
- ☞ The goal is to sustain ad-hoc business with simpler legal codes.
- ☞ ISO has developed an open EDI model in two ways,
 - a) Business Operational View (BOV) - Supports the semantics of business data with rules (business problems).
 - b) Functional Service View (FSV) - Addresses the mechanistic needs (technology problems).

4.8 EDI IMPLEMENTATION

It is a complicated activity. The step by step approach (totally 15 steps) involved in EDI implementation is explained below:

1. Obtain Commitment from all Areas of Management

Involvement from all impacted departments is essential. Each department should be included in the analysis, testing and implementation.

4.7 EDI AND ELECTRONIC COMMERCE

EDI services are seen as the bridge that automates external and internal business.

It is to reduce the cost of settings.

Traditional EDI

1. It is basically paper format.
2. Two basic areas are as follows,
 - a. Trade Data Interchange (TDI) - Transactions of data.
 - b. Electronic Funds Transfer (EFT) -Transactions of funds.
3. Traditional EDI is divided into two camps;
 - a. Old EDI and
 - b. New EDI.

Old EDI

- ☞ IT refers to the current practice of exchange of data.
- ☞ It is also refer to the EDI-standardization process (ANSI X12, EDIFACT).
- ☞ It is very expensive and narrowly specialized.

“EDIFACT - Electronic Data Interchange For Administration, Commerce and Trade.”

New EDI

- ☞ IT is refocusing on the old standardization process.

2. Establish a Plan

Develop a work plan that identifies the tasks required. This plan should also provide a direction of what type of documents you wish to trade.

3. Establish a Project Team

The team should establish a responsibility list for each identified task.

4. Establish EDI Business Contacts

These people are essential when working with other companies to ensure that the business needs are met.

5. Establish EDI Technical Contacts

These people will work in concert with the EDI Business Contacts and your Trading Partners to ensure that the stated process flows as expected.

6. Review Internal Systems and Business Procedures

A thorough current system analysis should be done. The present process that creates the business documents and the flow of the documents should be recorded. The next step is to determine how EDI should be integrated into existing systems.

7. Conduct a Trading Partner Survey

- ☒ This survey will provide you with a listing of your potential trading partners:
- ☒ EDI Experience and knowledge
- ☒ Network providers (or direct connections using the Internet)