

HAWASSA UNIVERSITY

E-commerce

Framework, Technology, Society

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2011

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Book Overview

The growth of the Internet continues to have a tremendous influence on business. Companies and organizations of all types and sizes are rethinking their strategies and how they run their operations. This book gives an opportunity to Information System (IS) program students to explore the realities and implications of e-commerce from a technical and marketer's perspective. This book introduces students to a wide range of technical aspects related to e-commerce and electronic commerce issues for marketers, as a foundation for continual learning in the dynamic e-commerce environment.

Learning Objectives

- To gain an understanding of the theories and concepts underlying e-commerce.
- To apply e-commerce theory and concepts to what e-marketers are doing in "the real world".
- To improve familiarity with current challenges and issues in e-commerce.

NOTE- E-Commerce is extremely dynamic. This book contents are subject to change with time. Students are expected to check the websites related to e-commerce latest development.

Comments, corrections, and other feedback most welcome at: qadirforu@gmail.com

(Abdul Kadir Khan)

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Chapter I

Introduction To E-commerce

Learning Objectives:

- Define e-commerce and describe how it differs from e-business
- Identify the unique features of e-commerce technology and discuss their business significance
- Describe the major types of e-commerce
- History of e-commerce
- Limitations of e-commerce
- How e-commerce works
- How to establish e-commerce

Internet has become an important medium for doing global business based on the state of the art technology. Electronic commerce has two major aspects: economical and technological. The stress of this course will show you how to get started in the complex and exciting world of Electronic Commerce. New standards and new facilities are constantly emerging and their proper understanding is essential for the success of an operation, and especially for those who are assigned a duty to select, establish, and maintain the necessary infrastructure.

1.1 What is E-commerce?

E-commerce is an emerging concept that describes the process of buying and selling or exchanging of products, services, and information via computer networks including the internet.

Definition of E-Commerce from Different Perspective

1. Communications Perspective

E-commerce is the delivery of information, products/services, or payments over the telephone lines, computer networks or any other electronic means.

2. Business Process Perspective

E-commerce is the application of technology toward the automation of business transactions and work flow.

3. Service Perspective

E-commerce is a tool that addresses the desire of firms, consumers, and management to cut service costs while improving the quality of goods and increasing the speed of service delivery.

4. Online Perspective

E-commerce provides the capability of buying and selling products and information on the internet and other online services.

1.2 E-commerce And E-business

There is a debate among consultants and academics about the meaning of and limitations of both e-commerce and e-business. Some argues that e-commerce encompasses the entire world of electronically based organizational activities that support a firm's market exchanges-including a firm's entire information system's infrastructure(By Rayport and Jaworksi).Other argues, on the other hand, that e-

business encompasses the entire world of internal and external electronically based activities, including e-commerce (Kalakota and Robinson)

But in simple terms-

E-commerce primarily involves transactions that cross firm boundaries.

E-business primarily concerns the application of digital technologies to business processes within the firm.

It means-there is no commercial transaction (i.e. exchange of value) in E-business but E-commerce involves commercial transaction.(see figure 1)

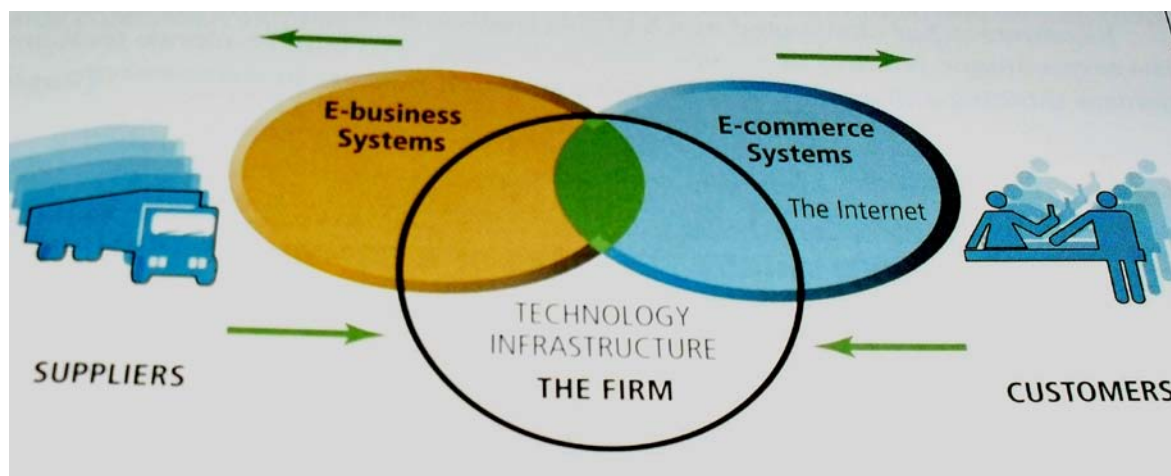


Figure 1.1-Difference between E-commerce and E-business

1.3 Unique Features of E-commerce Technology

Given below are the some unique features of E-commerce technology that is why it is in more demand compare to Traditional commerce:-

Ubiquity:- In traditional commerce, a *marketplace* is a physical place you visit in order to transact. For example, television and radio are typically directed to motivating the consumer to go someplace to make a purchase. E-commerce is *ubiquitous*, meaning that it is available just about everywhere, at all times. The result is called a *market place*-a marketplace extended beyond traditional boundaries and removed from a temporal and geographic location. From consumer point of view, ubiquity reduces *transaction costs*-the costs of participating in a market. Customer convenience is enhanced.

Global Reach:- The potential market size for e-commerce merchants is roughly equal to the size of the world's online population. In contrast, most traditional commerce is local or regional-it involves local merchants or national merchants with local outlets.

Universal Standards:- One strikingly unusual feature of e-commerce technologies is that the technical

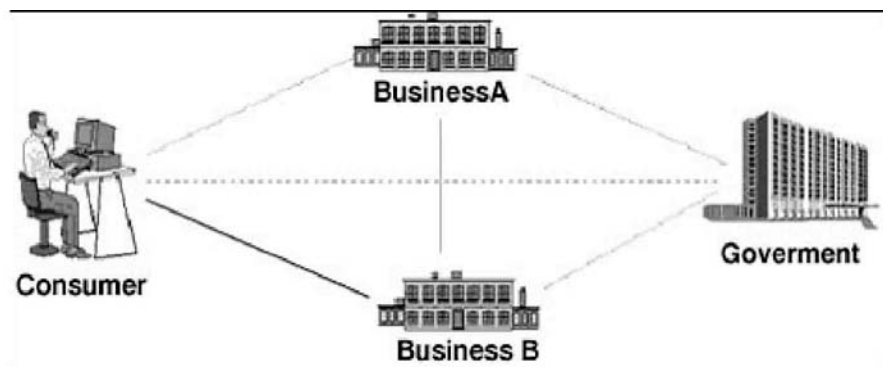
standard of the internet, and therefore the technical standards for conducting e-commerce , are *universal standards*-they are shared by all nations around the world. In contrast, most traditional commerce technologies differ from one nation to the next.

Richness:- Information richness refers to the complexity and content of a message. Traditional markets have great richness. They are able to provide personal and face to face service. The richness of traditional markets make them a powerful selling or commercial environment. But larger the audience reached, the less rich the message. That is why E-commerce came to existence.

Information Density:- *Information density* –the total amount and quality of information available to all market participants, consumers, and merchants alike.

Personalization/Customization:- E-commerce technologies permit *personalization*. Merchants can target their marketing messages to specific individuals by adjusting the message to a person's name, interests, and past purchases. The technology also permits *customization*-changing the delivered product or service based on a user's preferences.

1.4 Type of E-commerce



There are a number of different types of E-Commerce:-

- B2B - Business to Business
- B2C - Business to Consumer
- C2C - Consumer to Consumer
- P2P – Peer to Peer
- Mobile commerce

B2B - Business to Business

The two businesses pass information electronically to each other. It is the largest form of e-commerce. Typically in the B2B environment, E-Commerce can be used in the following processes:

- Procurement;
- order fulfillment;
- Managing trading-partner relationships.

Example:-eSteel.com is a steel industry exchange that creates an electronic market for steel producers and users.

B2C - Business to Consumer

The most commonly discussed type of e-commerce is Business to Consumer e-commerce, in which online businesses attempt to reach individual consumers. Even though it is comparatively smaller than B2B,it has grown exponentially since 1995.

Example:- Amazon.com is a general merchandiser that sells consumer products to retail consumers.

C2C - Consumer to Consumer

These sites are usually some form of an auction site. The consumer lists items for sale with a commercial auction site. Other consumers access the site and place bids on the items. The site then provides a connection between the seller and buyer to complete the transaction. The site provider usually charges a transaction cost.

Example:- eBay.com creates a marketplace where consumers can auction or sell goods directly to other consumers.

P2P-Peer to Peer

Peer to peer technology enables internet users to share files and computer resources directly without having to go through a central web server.

Example:-Gnutella is a software application that permits consumers to share music with one another directly, without the intervention of a market maker as C2C e-commerce.

M-commerce

Mobile commerce, or m-commerce, refers to the use of wireless digital devices to enable transactions on the web.

Example:- PDAs(personal digital assistants) or cell phones can be used to conduct commercial transactions.

NOTE-B2G-business to government e-commerce can be considered yet another type of e-commerce. But we subsume B2G e-commerce within B2B e-commerce, viewing the government as simply a form of business when it acts as a procurer of goods and/or services.

1.5 History of E-commerce

It is very difficult to pinpoint when e-commerce began. There were many precursors to e-commerce. In the late 1970s, a pharmaceutical firm named Baxter Healthcare initiated a primitive for of B2B e-commerce by using a telephone based modem that permitted hospitals to reorder supplies from Baxter.

The 1980s saw the development of EDI(electronic data interchange) standards that permitted firms to exchange commercial documents and conduct digital commercial transactions across private networks.

In the B2C arena, the first truly large scale digitally enabled transaction system was deployed in France in 1981. The French Minitel was a video text system that combined a telephone with an 8-inch screen. By the mid 1980s, more than 3 million minitels were deployed, and today there are about 15 million in use throughout France. Over 25000 different services can be found on minitel, including

ticket agencies, travel services, retail products, and online banking. No credit cards are needed because purchases are charged to the monthly telephone bill.

However, none of these precursor systems had the functionality of the internet. Thus we will say it began in 1995, following the appearance of the first banner advertisements placed by ATT, Volvo, Sprint, and others on Hotwired.com in late October 1994, and the first sales of banner ad space by Netscape and Infoseek in early 1995. Since then, e-commerce has been the fastest growing form of commerce in the world.

1.6 Limitation of E-commerce

There are several limitations on e-commerce that have the potential to cap its growth rate and ultimate size. Some of these limitations are as follows:-

Expensive Technology:- Using the internet requires a \$500 PC (minimal) and a \$10/month connect charge.

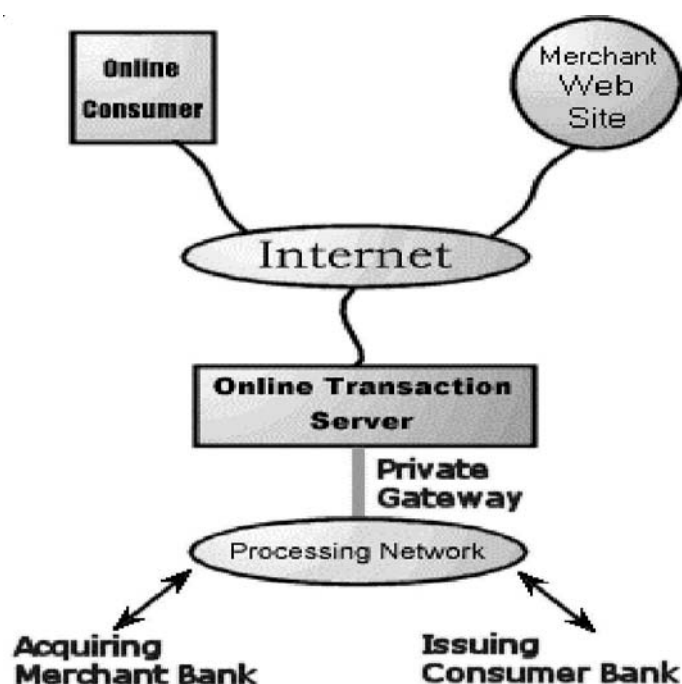
Complex Software Interface:- Using the web requires installation of a complex operating system and application suite that is far more difficult to operate than a television or telephone.

Sophisticated Skill Set:- The skills required to make effective use of the internet and e-commerce capabilities are far more sophisticated than, say, for television or newspapers.

Cultural Attraction and Social Event:- For many, shopping is a cultural and social event where people meet directly with merchants and other consumers. This experience cannot yet be duplicated in digital form.

Limited Access of Technology:- Most of the world's population does not have telephone service, PCs, or cell phones.

1.7 How e-Commerce Works



The consumer first moves through the internet to the merchant's web site. At the web site, the consumer is briefly given an introduction to the product or services the merchant offers. It is at this point that the consumer makes the decision to visit the web store by clicking on a link or button located on the web page (e.g., Buy Now, Shop Online, or an image of a shopping cart button are common entry points into a web store). After choosing to visit the web store, the consumer is typically connected to an online transaction server located somewhere else on the internet which runs software commonly referred to as a shopping cart application. The shopping cart application has been setup by the merchant to display all products and services offered, as well as calculate pricing, taxes, shipping charges, etc.

From there, the consumer decides that he wants to purchase something, so he enters all pertinent credit card information and a sales order is produced. Depending on the ecommerce implementation, the sales order can now take two totally different paths for confirming to the consumer that the order is officially placed.

Scenario 1

The consumer's credit card information goes directly through a private gateway to a processing network, where the issuing and acquiring banks complete or deny the transaction. This generally takes place in no more than 5-7 seconds and the consumer is then informed that the order was received, the credit card was authorized, and that the product will ultimately be shipped.

Scenario 2

The consumer's entire order and credit card information is electronically submitted back to the merchant's server (usually via email, FTP, or SSL connection) where the order can be reviewed first and then approved for credit card authorization through a processing network. The consumer then receives an email shortly afterwards, confirming the order being received, the credit card being authorized, and status on when the product will exactly be shipped.

In both scenarios, the process is transparent to the consumer and appears virtually the same. However, the first scenario is a more simplistic method of setting up a shopping cart application and does not take into consideration any back office issues that may delay shipment (i.e., items out of stock, back orders, orders submitted after office hours or during holidays, etc.). This second scenario keeps the consumer accurately informed throughout the entire ordering process.

1.8 How to Establish E-commerce

There are several basic steps you will need to accomplish before becoming Commerce Enabled.

- Getting a Merchant Bank Account
- Web Hosting
- Web Design Considerations
- Registering a Domain Name
- Obtaining a Digital Certificate

Let us review each step in more detail below:

Getting a Merchant Bank Account

In order to be able to accept credit cards, you must apply for an account with a credit card merchant account provider. This can be relatively easy or somewhat difficult, depending on which country you live in, and the type of business you are running. In the past, many businesses would sign up for credit card processing through their own commercial banking institutions. However, the internet has now made it simple to shop around for the best credit card discount rates from an endless amount of merchant account providers worldwide. A simple web search on "credit card processor" should be enough to get you started. Depending on how you process credit cards (especially if you plan on using Scenario 1 from the introduction), you may need to find a merchant account provider that specializes in internet payment transactions.

When choosing a merchant account provider, the following should also be noted:

1. Your merchant account provider must allow you to handle non-swiped credit card transactions. This refers to transactions where the customer is not present and only the credit card number and expiration date are being used for approving the charges.
2. When choosing a merchant account provider, you should do a little research on the company's reputation, years in business, and company size. Constantly changing to a new merchant account provider when your old one goes out-of-business can be costly and time consuming.
3. Avoid merchant account providers that ask for a non-refundable fee before you get approved.
4. Avoid merchant account providers that require 1 or 2 year contract terms. Since there are so many merchant account providers available, it doesn't make sense to lock your company into a commitment for any period of time.
5. Expect merchant account providers to have some form of a sign up fee after being approved only. These fees can come in the form of an application fee, processing fee, software fee, etc. Typically expect to pay around \$100 to \$500 for getting an account setup to accept credit cards and sometimes electronic checks.
6. You should be able to find a merchant account provider that can offer you discount credit cards rates ranging from 1.75% to 2.75% and no more than .25 cent per transaction.
7. You will need a dedicated phone line or data line for processing credit cards and electronic checks.

Web Hosting

Web hosting is a very important step in this process, as this is how you gain a presence on the internet in the first place. There are actually two scenarios that can be used for web hosting. Scenario1 involves setting up and maintaining your own web server, while Scenario 2 involves farming out all web hosting administration to an ISP. (Scenario 1 will not be discussed further in this article as it pertains to larger organizations which are not concerned with the high expense of running their own web server, hiring permanent IT staff, dealing with security, etc.)An Internet Service Provider (ISP) is a company that provides you with internet access and limited hard drive space on their web servers for hosting your web site. You will need to setup an account for internet access with the ISP of your choice.

The following should be noted when searching for an Internet Service Provider:

1. Always try to find an ISP that can provide a local telephone number for you to connect to the internet.
2. Choose an ISP that is known for having few interruptions of service.
3. Choose an ISP that is known for good technical support and has knowledgeable people familiar with

ecommerce sites.

4. As with any company you do business with, make sure the ISP is reputable.

Now, here is the part that gets a bit tricky to understand. The online transaction providers that offer the actual web store itself can sometimes be hosted by your same ISP or may require a completely different provider, referred to as a Commerce Service Provider (CSP). Many small businesses tend to choose CSP's for creating a web store because it gives them the flexibility of choosing a provider that offers competitive pricing and the best shopping cart application for their needs. Online transaction providers will usually provide one shopping cart solution they feel is better than the many others that exist and differ by price, appearance, layout, functionality, and ease of use.

The following should be noted when dealing with shopping cart applications:

1. Online transaction providers will either sell or rent you the use of an online shopping cart application for your business. Be forewarned that purchasing an online shopping cart application is very expensive. Most businesses will rent these online web store programs rather than committing to such a steep investment.
2. Rental pricing for the use of shopping cart programs vary depending on number of transactions generated a month, number of products listed on the shopping cart application, and the sophistication of the shopping cart application itself.

Web Design Considerations

With little knowledge of HTML and a lot of patience, you can probably create your own corporate web site with the help of products like Microsoft FrontPage™ or DreamWeaver™. However, when adding a web store to your web site, you may want to seek the help of professional web designers to make the look and feel of your web store consistent with the rest of your corporate web site. Most shopping cart applications, like SoftCart by Mercantec, allow its templates to be modified just for this purpose. In many cases, the same ISP or CSP you choose can provide web design and consultation.

Registering a Domain Name

If your business already has a corporate web site implemented, then you probably already have a domain name and don't need to read this section. Domain names are the names for computers on the Internet that correspond to IP (Internet protocol) numbers to route information to addresses on the Internet network. Domain names serve as a convenient way of locating information and people on the Internet. In layman terms, will it be important to you, for customers to find your web site by typing "123.123.456.456" or by typing something simple to remember like "www.mybiz.com?" Registering a

domain name is one of the most important decisions you can make for your online identity. Your domain name says who you are to your clients, your peers - the whole world. The basics for registering a domain name are: 1. Contact a domain name registrar on the internet to register for a domain name. There are many to choose from, just do a web search on “domain name registrar” to get you started. 2. Select a unique domain name you would like others to use for finding your web site. One place to go for checking availability of a domain name is www.whois.net³. Expect a registration fee of \$10 - \$100 annually for the central registrar to keep your domain name active on the internet.

Obtaining a Digital Certificate

A digital certificate, also known as a SSL Server Certificate, enables SSL (Secure Socket Layer encryption) on the web server. SSL protects communications so you can take credit card orders securely and ensure that hackers cannot eavesdrop on you. Any ecommerce company that provides you with an online web store will require you to have SSL before you can use their services. Thankfully, for most people obtaining a digital certificate is not a problem. For a minimal fee, one can usually use the certificate owned by the web hosting company where your page resides. If you are a larger company, however, you may want to get your own digital certificate. A certificate costs about \$125.00.

Conclusion

Commerce can be a very rewarding venture, but it should not be undertaken lightly. There is a lot of information to absorb. Here are some additional tips on creating a successful Online Store:

- If you know nothing about web design, it is probably a good idea to hire a designer.
- Marketing your site is very important on the web. Here are some useful tips:
 - i Submit your site to as many search engines as possible.
 - ii Try finding web sites with similar themes and make deals to create reciprocal links.
 - iii Put your URL in the signature file of your email and the header of all business correspondence.
 - iv Word of mouth is very powerful on the Net; tell all of your friends about your page.

Now that you know the basics, you should be able to make some informed decisions about how to proceed. Remember that you can ask for further advice from the e-commerce company that you decide to employ.

Chapter II

E-commerce Business Models

Learning Objectives:

- Identify the key components of e-commerce business models
- Describe the major B2C business models
- Describe the major B2B business models
- Describe the major C2C business models
- Describe the major P2P business models
- Describe the major M-commerce business models
- Major e-commerce applications

Business Model:- It is a set of planned activities(sometimes referred to as *business process*)designed to result in a profit in a marketplace. The business model is at the center of the business plan. A **business plan** is a document that describes a firm’s business model. An **e-commerce business model** aims to use and leverage the unique qualities of the Internet and the World Wide Web.

2.1 Eight Key Components(Ingredients) of A Business Model

If you hope to develop a successful business model in any arena, not just e-commerce, you must make sure that the model effectively addresses the eight elements described below:-

Value Proposition:- It defines how a company’s product or service fulfils the need of customers. To develop a value proposition, you need to answer the following key questions:

- Why will customer choose to do business with your firm instead of another company?
- What will your firm provides that other firms do not and cannot?

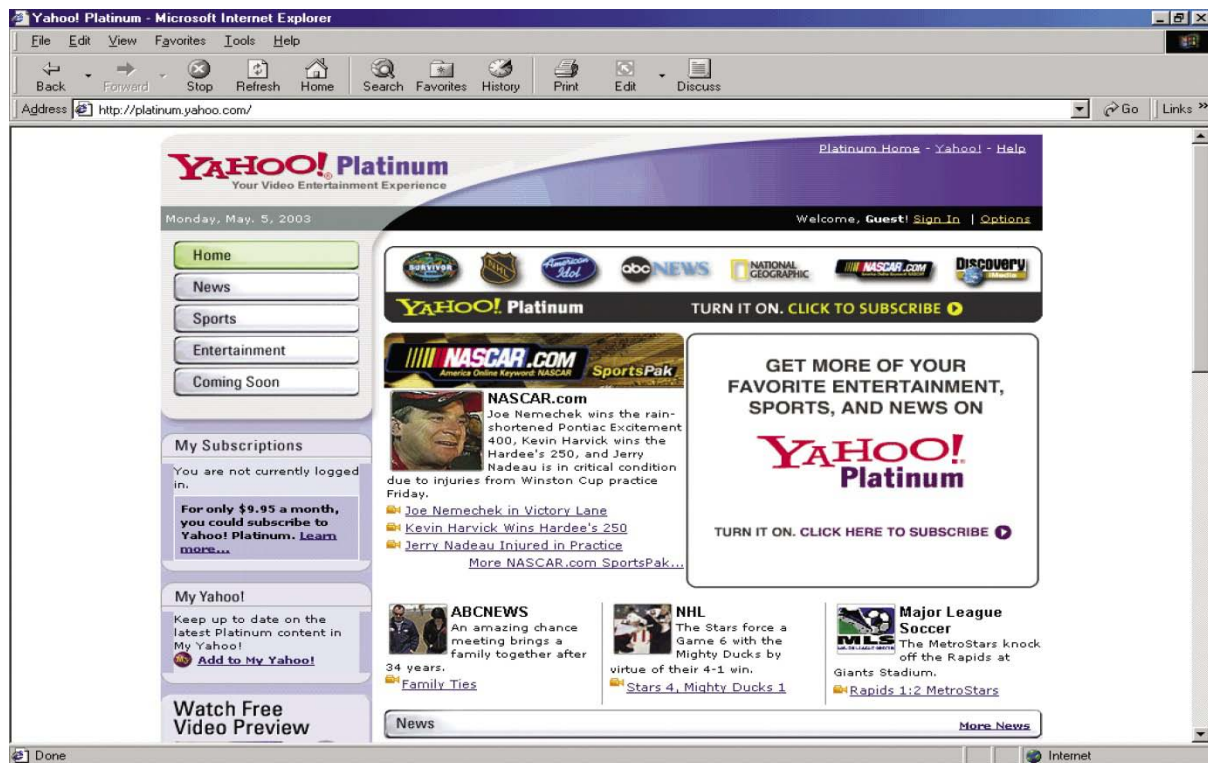
From the customer point of view, successful e-commerce value propositions include:

- Personalization/customization of product offerings.
- Reduction of product search costs.
- Reduction of price discovery costs.
- Facilitation of transactions by managing product delivery.

Example: FreshDirect primarily is offering customers the freshest perishable food in New York, direct from growers and manufacturers, at the lowest prices, delivered to their homes in night. Although local supermarkets can offer fresh food also, customers need to spend an hour or two shopping at those stores every week. Convenience and time saving are very important elements in Fresh Direct’s value proposition to customer.

TABLE 2.1 KEY INGREDIENTS OF A BUSINESS MODEL	
COMPONENTS	KEY QUESTIONS
Value proposition	Why should the customer buy from you?
Revenue model	How will you earn money?
Market opportunity	What marketplace do you intend to serve, and what is its size?
Competitive environment	Who else occupies your intended marketplace?
Competitive advantage	What special advantages does your firm bring to the marketplace?
Market strategy	How do you plan to promote your products or services to attract your target audience?
Organizational development	What types of organizational structures within the firm are necessary to carry out the business plan?
Management team	What kinds of experiences and background are important for the company’s leaders to have?

Yahoo Uses a Subscription Business Model for Yahoo Platinum



Example:- Yahoo has broadened its business model to include a monthly subscription to yahoo platinum, which give viewers access to CNN, ABC News, and other video feeds.

- *Transaction Fee Revenue Model:-* In this model, a company receives a fee for enabling or executing a transaction.

Example:- eBay.com created an online auction marketplace and receives a small transaction fee from a seller if the seller is successful in selling the item.

- *Sales Revenue Model:-* In this model, companies derive revenue by selling goods, information, or services to customers.

Example:- Companies such as Amazon.com, LLBean.com, and Gap.com, all have sales revenue models.

- *Affiliate Revenue Model:-* In this model, sites that steer business to an “affiliate” receives a referral fee or percentage of the revenue from any resulting sales.

Example:- Mypoints.com makes money by connecting companies with potential customers by offering special deals to its members.

Amazon Uses a Sales Revenue Model



TABLE 2.2

FIVE PRIMARY REVENUE MODELS

REVENUE MODEL	EXAMPLES	REVENUE SOURCE
Advertising	Yahoo.com	Fees from advertisers in exchange for advertisements
Subscription	WSJ.com, Consumerreports.org Sportsline.com	Fees from subscribers in exchange for access to content or services
Transaction Fee	eBay.com, E-Trade.com	Fees (commissions) for enabling or executing a transaction
Sales	Amazon.com, LLBean.com, Gap.com, Sears.com, JCPenny.com	Sales of goods, information, or services
Affiliate	MyPoints.com	Fees for business referrals

Market Opportunity:- It refers to the company's intended marketplace(i.e. an area of actual or potential commercial value) and the overall potential financial opportunities available to the firm in that marketplace. The market opportunity is usually divided into smaller market niches. The realistic market opportunity is defined by the revenue potential in each of the market niches where you hope to compete.

Example:-Let's assume you are analyzing a software training company that creates software-learning systems for sale to corporations over the internet. The overall size of the software training market for all the market segments is approximately \$70 billion. The overall market can be broken down, however, into two major market segments:

**Instructor led training products, which comprise about 70% of the market (\$49 billion in revenue).*

**Computer based training, which accounts for 30% (\$21 billion).*

Within each of those major market segments, there are further market niches, such as the fortune 500 computer based training market, and the small business computer based training market. Large brand name training firms dominate this niche. The start up firms' real market opportunity is to sell the thousands of small business firms who spend about \$6 billion on computer based software training and who desperately need a cost effective training solution. This is the size of the firm's realistic market opportunity.(FIGURE 2.1).

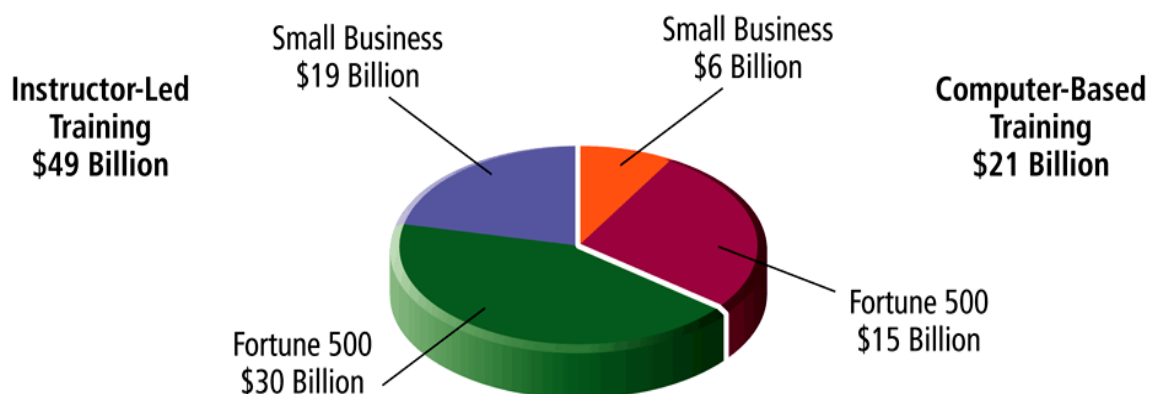


Figure 2.1- marketplace and market opportunity in software training market.

Competitive Environment:- A firm's competitive environment refers to the other companies selling similar products and operating in the same marketplace. It is influenced by several factors:

- How many competitors are active?

- How large their operations are?
- What the market share of each competitor is?
- How profitable these firms are?
- How they price their products?

Firms typically have two type of competitors:-

- *Direct Competitors*:- direct competitors are those companies that sale products and services that are very similar and into the same market segments.

Example:- Batti Travels and Global Travels(both are in addis ababa), both of whom sell discount airline tickets online, are direct competitors because both companies sell identical products-cheap tickets.

- *Indirect Competitors*:- Indirect competitors are those companies that may be in different industries but still compete indirectly because their products can substitute for one another.

Example:- Automobiles manufacturers and airline companies operate in different industries, but they still compete indirectly because they offer consumers alternative means of transportation.

Competitive Advantage:- Firms achieve a competitive advantage when they can produce a superior product and/or bring the product to market at a lower price than most, of their competitors.

Different terms related to competitive advantage:

- *Asymmetry*:- an asymmetry exists whenever one participant in a market has more resources –financial backing, knowledge, information, and/or power-than other participants.
- *First Mover Advantage*:- It is a competitive market advantage for a firm that results from being the first into a marketplace with a serviceable product or service.
- *Complimentary Resources*:- Most of the first movers lack the complimentary resources(resources and assets not directly involved in the production of the product but required for success such as marketing , management, financial assets, and reputation.
- *Unfair Competitive Advantage*:- It occurs when one firm develops an advantage based on a factor that other firms cant purchase. For instance, a brand name cannot be purchased and is in that sense an unfair advantage.

- **Leverage:-** Companies are said to leverage their competitive assets when they use their competitive advantages to achieve more advantage in surrounding markets. For instance, Amazon.com's move into the online auction arena leveraged the company's huge customer database, offering customers one more way to buy from Amazon and giving them new access to just about any item someone else had to sell.

Market Strategy:- It is the plan you put together that details exactly how you intend to enter a new market and attract new customers.

Organizational Development:- Companies that hope to grow and thrive, need to have a plan for organizational development that describes how the company will organize the work that needs to be accomplished. Typically work is divided into functional departments, such as production, shipping, marketing, customer support and finance.

Management Team:- It is the most important component of a business model. Management team is responsible for making the model work. A strong management team may not be able to salvage a weak business model, but they should be able to change the model and redefine the business as it becomes necessary.

2.2 Major E-commerce Business Models

Categorizing E-commerce Business Models: Some Difficulties:

- No one correct way: There are many e-commerce business models, and more are being invented every day. The number of such models is limited only by the human imagination, and our list of different business models is certainly not exhaustive. So it is important to realize that there is no correct way to categorize these business models.
- We categorize business models according to e-commerce sector (B2C, B2B, and C2C): Fundamentally similar business models may appear in more than one sector. For example, the business models of online retailers (e-tailers) and e-distributors are quite similar. However they are distinguished by the market focus of the sector in which they are used. In case of e-tailers in the B2C sector, the business model focuses on the sales to the individual customer, while in the case of the e-distributor, the business model focuses on sales to another business.
- Type of e-commerce technology used can also affect classification of a business model: For example, m-commerce refers to e-commerce conducted over wireless networks. The e-tail business model, for instance, can also be used in m-commerce

and while the basic business model may remain fundamentally the same as that used in the B2C sector.

- Some companies use multiple business models: For instance, eBay.com can be considered as a B2C market maker. At the same time, eBay can also be considered as having a C2C business model.

2.2.1 Major B2C(business to consumer) Business Models

- **Portal:-** Portals such as yahoo.com,MSN.com, and AOL.com offer users powerful web search tools as well as an integrated package of content and services, such as news, email, instant messaging, calendars, shopping, music downloads, video streaming, and more, all in one place. They typically utilizes a combines subscription/advertising revenues/transaction fee model.

There are two type of portal business models:-

- Horizontal portals (Generalized)- Yahoo, AOL, MSN, and others like them are considered to be horizontal portals because they define their market space to include all users of the internet.

Vertical portals(Vortals)- They attempt to provide similar services as horizontal portals, but are focused around a particular subject matter or market segment. For example, sailnet.com specializes in the consumer sailboat market. Although, total number of vortal users may be much lower than the number of portal users, if the market segment is attractive enough, advertisers are willing to pay a premium in order to reach a targeted audience.

- **E-tailer:-** It is an Online version of traditional retailer.

Types include:

Virtual merchants:-online version of retail store, where customers can shop at any hour of the day or night without leaving their home or office.

Example- Amazon.com

Clicks and bricks:- online distribution channel for a company that also has physical stores.

Example- Wal-Mart.com, Sears.com

Catalog merchants:- Online version of direct mail catalog.

Example- LandsEnd.com, LLBean.com

Manufacturer-direct:- Manufacturer selling directly over the Web.

Example- Dell.com, Compaq.com

The e-tail revenue model is product-based, with customers paying for the purchase of a particular item.

This sector is extremely competitive, however. Since *barriers to entry* (the total cost of entering a new marketplace) into the web e-tail market are low, tens of thousands of small e-tail shops have sprung up on the web.

Keeping expenses low, selection broad, and inventory controlled are keys to success in e-tailing, with inventory being the most difficult to gauge.

- **Content Provider**:- Although there are many different ways the internet can be useful, *information content*, which can be defined broadly to include all forms of intellectual property, is one of the largest type of internet usage.

- *Intellectual property refers to all forms of human expression that can be put into a tangible medium such as text, CD, or the web.

- *Content providers distribute information content, such as digital news, music, photos, videos, and artwork over the web.

- *Retrieving and paying for content is the second largest revenue source for B2C e-commerce.

- *More internet users go on the web to retrieve information than to purchase products (80% versus 53%).

- *Content providers make money by charging a subscription fees, advertising fees, affiliate referral fees.

The key to becoming a successful content provider is owning the content. Traditional owners of copyrighted content-publishers of books and newspapers, broadcasters of radio and television content, music publishers, and movie studios-have powerful advantages over newcomers to the web. Some content providers, however, do not own content, but syndicate (aggregate) and then distribute content produced by others.

- *Syndication is a major variation of the standard content provider model.

- *Any e-commerce startup that intends to make money by providing content is likely to face difficulties unless it has a unique information source that others cannot access.

Examples:- sportsline.com, cnn.com, rhapsody.com, espn.com.

■ **Transaction Broker:-** Sites that process online transactions for consumers are transaction brokers.

*Primary value proposition – saving of time and money

*Typical revenue model – transaction fee

*Industries using this model:

Financial services (example:-e-trade.com)

Travel services (example:-travelocity.com)

Job placement services (example:-monster.com)

Transaction broker makes money each time a transaction occurs. Each stock trade, for example, nets the company a fee, based either on a flat rate or a sliding scale related to the size of the transaction. Attracting new customers and encouraging them to trade frequently are the keys to generating more revenues for these companies. Job sites generate listing fees from employers up front, rather than charging a fee when a position is filled.

■ **Market Creator:-** Market creator uses Internet technology to create markets that bring buyers and sellers together.

Examples: Priceline.com, eBay.com

Market creator typically uses a transaction fee revenue model.

The market opportunity for market creators is potentially vast, but only if the firm has the financial resources and marketing plan to attract sufficient sellers and buyers to the marketplace.

In addition to marketing and branding, a company's management team and organization can make a difference in creating new markets, especially if some managers have had experience in similar businesses. Speed is often the key in such situations. The ability to become operational quickly can make the difference between success and failure.

■ **Service Provider:-** *They Offers services online.

*Value proposition – valuable, convenient, time-saving, low-cost alternatives to traditional service providers

*Revenue models – subscription fees or one-time payment

For example, many service providers offer computer services, such as information storage at xDrive.com; provide consulting services, such as at mybconsulting.com, where small businesses can obtain business advice.

The market opportunity for service providers is as large as the variety of services that can be provided and potentially is equal to the market opportunity for physical goods.

Name recognition in order to build comfort is the first challenge, with the second challenge being enticing consumers to try the service.

Community Provider:- Community providers are sites that create a digital online environment where people with similar interests can transact, communicate, and and receive interest-related information.

*Revenue models- advertising fees, subscription fees, affiliate referral fees

Examples: Epinions.com, Oxygen.com, About.com.

TABLE 2.3		B2C BUSINESS MODELS		
BUSINESS MODEL	VARIATIONS	EXAMPLES	DESCRIPTION	REVENUE MODEL
Portal	Horizontal/General	Yahoo.com AOL.com MSN.com	Offers an integrated package of content services and content-search, news, e-mail, chat, music downloads, video streaming, calendars, etc. Seeks to be a user's home base.	Advertising, subscription fees, transaction fees
	Vertical/Specialized (Vortal)	Sailnet.com	Offers services and products to specialized marketplace	Same
E-tailer	Virtual Merchant	Amazon.com	Online version of retail store, where customers can shop at any hour of the day or night without leaving their home or office.	Sales of goods
	Clicks and Bricks	Wal-Mart.com Sears.com	Online distribution channel for a company that also has physical stores	Same
	Catalog Merchant	LandsEnd.com LLBean.com	Online version of direct mail catalog	Same
	Manufacturer direct	Dell.com Compaq.com		Sales of goods
Content Provider		WSJ.com, Sportsline.com CNN.com, Rhapsody.com ESPN.com	Information and entertainment providers like newspapers, sports sites, and other online sources that offer customers up-to-date news and special interest how-to guidance and tips and/or information sales.	Advertising, subscription fees, affiliate referral fees
Transaction Broker		E-Trade.com Expedia.com Monster.com Travelocity.com Hotels.com Orbitz.com	Processors of online sales transactions, such as stock brokers and travel agents, that increase customers' productivity by helping them get things done faster and more cheaply.	Transaction fees
Market Creator	Auctions	Ebay.com Priceline.com Amazon.com	Web-based businesses that use Internet technology to create markets that bring buyers and sellers together	Transaction fees
Service Provider		Mybconsulting.com Lawinfo.com xDrive myCFO.com	Companies that make money by selling users a service, rather than a product.	Sales of services
Community Provider		About.com iVillage.com NetNoir.com Oxygen.com Epinions.com	Sites where individuals with particular interests, hobbies, and common experiences can come together and compare notes.	Advertising, subscription, affiliate referral fees

2.2.2 Major B2B(business to business) Business Models

- **E-Distributor:-** Companies that supplies products and services directly to individual businesses are e-distributor.

Examples: W.W. Grainger is the largest distributor of maintenance, repair, and operations (MRO) supplies. In the past, Grainger relied on catalog sales and physical distribution centers in metropolitan areas. Its catalog of equipment went online in 1995 at **grainger.com**, giving businesses access to more than 220,000 items. Company purchasing agents can search by type of product, such as motors, HVAC, or fluids, or by specific brand name.

- **E-Procurement:-** Companies that create and sell access to digital electronic markets are known as E-procurement companies.

Example: Ariba.com, it has created software that helps large firms organize their procurement process by creating mini-digital markets for a single firm. Ariba creates custom integrated online catalogs (where supplier firms can list their offerings) for purchasing firms. On the sell side, ariba helps vendors sell to large purchasers by providing software to handle catalog creation, shipping, insurance, and finance. Both the buy and sell side software is referred to generally as “*value chain management*” software.

B2B service provider is one type of those companies who offer purchasing firms sophisticated set of sourcing and supply chain management tools. These companies are getting revenue through transaction fees, fees based on the number of workstations using the service, or annual licensing fees.

Application service providers such as Ariba or CommerceOne, are a subset of B2B service providers. They are able to offer firms much lower costs of software by achieving *scale economics*. This is much more efficient than having every firm build its own *supply chain management system*, and it permits firms like ariba and CommerceOne to specialize and offer their software to firms at a cost far less than the cost of developing it.

Exchanges (Marketplace or B2B hubs) :- An exchange is an electronic digital marketplace where suppliers and commercial purchasers can conduct transactions. It is usually owned by independent firms whose business is making a market.

They generate revenue by charging transaction fees. They usually serve a single vertical industry such as steel, polymer, and aluminum.

For buyers, B2B exchanges make it possible to gather information, check out suppliers, collect prices, and keep up to date on the latest happenings all in one place. Sellers, on the other hand, benefit from expanded access to buyers. The greater the number of sellers and buyers, the lower the sales cost and the higher the chances of making a sale.

The ease, speed, and volume of transactions are summarily known as MARKET OPPORTUNITY.

Example: C02E.com: Global Pollution Market

Industry Consortia:- They are industry-owned *vertical marketplaces* that serve specific industries such as the automobile, aerospace, or chemical.

Example: Covisint (the objective of covisint is to assist the automobile industry in dramatically increasing the efficiency of the supply chain by both creating digital markets and increasing coordination among buyers and suppliers.

Horizontal marketplaces, in contrast, sell specific products and services to a wide range of industries.

■ **Private Industrial Networks:-** Private industrial networks are digital networks (usually, but not always Internet-based) designed to coordinate the flow of communications among firms engaged in business together.

There are two types of private industrial networks:

- **Single firm network:-** Single firm networks are the most common form of private industrial networks owned by a single large purchasing firm, such as Wal-Mart. Participation is by invitation only to trusted long term suppliers of direct inputs. It is an effort to include key suppliers in the firm's own business decision making. Wal-mart operates one of the largest single firm networks in the world for its suppliers, who on a daily basis use Wal-Mart's network to monitor the sales of their goods, the status of shipments, and the actual inventory level of their goods. About 70% of all B2B e-commerce uses an older technology called *electronic data interchange (EDI)* for one to one relationships between a single supplier and a single purchaser, and originally was designed for proprietary networks, although it is migrating rapidly to the internet. More powerful web technologies are

replacing EDI in part because they can enable many to one, many to many market relationships where there are many suppliers selling to a single or small group of very large purchasers that is why *industry wide networks* came to existence.

- *Industry Wide Networks*:- they often evolve out of industry associations. These networks are usually owned by a consortium of the large firms in an industry and have the following goals:
 - ✓ Providing a neutral set of standards for commercial communication over the internet.
 - ✓ Having shared and open technology platforms for solving industry problems.
 - ✓ Providing operating networks that allow members of an entire industry to closely collaborate.

Example:- WWRE (the world wide retail exchange) is a global internet-based business to business exchange for retailers and suppliers designed to facilitate and simplify trading among retailers, suppliers, partners, and distributors.

2.2.3 C2C (consumer to consumer) Business Models

C2C business models provide a way for consumers to sell to each other, with the help of an online business. The first and best example of this type of business is eBay.com, utilizing a market creator model.

Consumers who do not like auctions but still want to find used merchandise can visit *half.com* (also owned by eBay), which enables consumers to sell of unwanted books, movies, music, and games to other consumers. Unlike eBay, it allows sellers to set a fixed price for each item, rather than putting it up for bid. It, too, is doing well.

2.2.4 P2P (peer to peer) Business Models

They link users, enabling them to share files and common resources without a common server. The main challenge for P2P ventures is to develop viable, legal business models

Example: Kazaa, Groovenetworks.

TABLE 2.4 B2B BUSINESS MODELS			
BUSINESS MODEL	EXAMPLES	DESCRIPTION	REVENUE MODEL
<i>(1) NET MARKETPLACES</i>			
E-Distributor	Grainger.com FindMRO.com Staples.com	Single-firm online versions of retail and wholesale stores; supply maintenance, repair, operation goods; indirect inputs	Sales of goods
E-Procurement	Ariba.com CommerceOne.com Siemens	Single firms creating digital markets where thousands of sellers and buyers transact for indirect inputs	Fees for market-making services; supply chain management, and fulfillment services
Exchanges	Exchange.eSteel.com IMX.com GEPolymerland.com	Independently owned digital marketplaces for direct inputs. Vertical industry orientation	Fees and commissions on transactions
Industry Consortia	Covisint.com Sciquest.com Pasticsnet.com	Industry-owned vertical digital markets open to select suppliers.	Fees and commissions on transactions
<i>(2) PRIVATE INDUSTRIAL NETWORKS</i>			
Single-firm networks	Wal-Mart Proctor & Gamble DaimlerChrysler Ford Motor Co.	Company-owned networks to coordinate supply chains with a limited set of partners	Cost absorbed by network owner and recovered through production and distribution efficiencies.
Industry-wide networks	Nistevo Inc. Globalnetxchange.com UCCnet.org Worldwideretailexchange.org	Industry-owned networks to set standards, coordinate supply and logistics for the industry	Contributions from industry member firms and recovered through production and distribution efficiencies; fees for transactions and services

Note:- We will study supply chain management system and EDI more fully in UNIT 5 and Unit 6.

2.2.5 M-commerce Business Models

M-commerce takes traditional e-commerce business models and leverages emerging new wireless technologies. Key technologies are telephone-based 3G; Wi-Fi; and Bluetooth.

Any business model who uses technologies like Wi-Fi, Bluetooth, and telephone based 3G, comes under m-commerce business models.

TABLE 2.5**BUSINESS MODELS IN EMERGING E-COMMERCE AREAS**

BUSINESS MODEL	MODEL	EXAMPLES	DESCRIPTION	REVENUE MODEL
Consumer-to-consumer	Market Creator	eBay.com Half.com	Helps consumers connect with other consumers to conduct business	Transaction fees
Peer-to-peer	Content provider	Kazaa.com Groovenetworks.com	Technology enabling consumers to share files and services via the Web, without common servers	Subscription fees, advertising, transaction fees
M-Commerce	Various	Armani Skyline Chili	Extending business applications using wireless technology	Sales of goods and services

2.3 E-commerce Enablers: The Internet Infrastructure Companies

Companies, whose business model is focused on providing infrastructure necessary for e-commerce companies to exist, grow and prosper, are known as *E-commerce Enablers*. They provide hardware, software, networking, security, e-commerce software systems, payment systems, databases, hosting services, etc. (Table 2.6).

TABLE 2.6**E-COMMERCE ENABLERS**

INFRASTRUCTURE	PLAYERS
Hardware: Web Servers	IBM, HP/Compaq, Dell, Sun
Software: Operating Systems and Server Software	Microsoft, RedHat Linux, Sun, Apache Software Foundation
Networking: Routers	Cisco, JDS Uniphase, Lucent
Security: Encryption Software	VeriSign, Check Point, PGP Corporation
E-commerce Software Systems (B2C, B2B)	IBM, Microsoft, CommerceOne, Ariba, BroadVision
Streaming Media Solutions	Real Networks, Microsoft, Apple
Customer Relationship Management Software	PeopleSoft, Siebel, SAP
Payment Systems	Verisign, PayPal, CyberCash
Performance Enhancement	Akamai, Cache Flow, Inktomi, Cidera
Databases	Oracle, IBM, Microsoft, Sybase
Hosting Services	Interland, IBM, WebIntellects

2.4 Electronic Commerce Applications

- Supply chain management
- Video on demand.
- Remote banking
- Procurement and purchasing.

Project 1:-

Maximum marks: 10

Select an E-commerce company. Visit its web site and describe its business model based on the information you find there. Identify its customer value proposition, its revenue model, the marketplace it operates in, who its main competitors are, any comparative advantages you believe the company possesses, and what its market strategy to be. Also try to locate the information about the company's management team and organizational structure (check for a page labelled "the company," "about us," or something similar). Also give recommendations for improving that website with valid reason.

- ✓ Submit the hard copy of the above project before due date.
- ✓ Make the PowerPoint presentation for class presentation session.

Weightage for different modules of the project 1 is as follows:

Website Analysis	35%
Documentation	25%
Class Presentation	25%
Recommendations	15%

Website Analysis:- It should consist the detailed description of the different components (written in the project) of the business model of that website.

Documentation:- Clarity of the contents, and proper binding of the hard copy.

Class Presentation:- It includes your body language, voice clarity and contents of your presentation (slide show and contents of your project).

Recommendations:- The final section, Recommendations, is a summary of practical recommendations for improving that website (not the entire website or store).

Note: It is not a group project so every student should have a unique e-commerce company and unique documentation.

Chapter III

E-commerce Infrastructure

Learning Objectives:

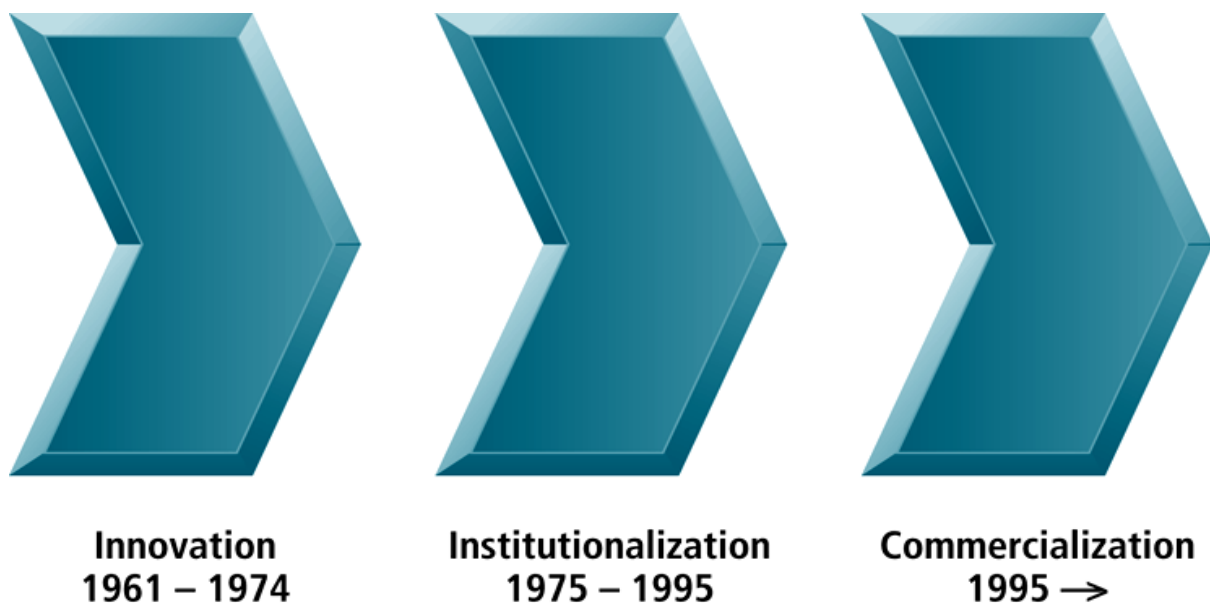
- Discuss the origins of the Internet
- Identify the key technology concepts behind the Internet
- Describe the role of Internet programs and utility programs
- Explain the current structure of the Internet
- Understand the limitations of today's Internet
- Describe the potential capabilities of Internet II
- Understand how the World Wide Web works
- Describe how Internet and Web features and services support e-commerce

3.1 The Internet: Technology Background

- Internet: An interconnected network of thousands of networks and millions of computers, linking businesses, educational institutions, government agencies and individuals
- World Wide Web (Web): One of the Internet's most popular services, providing access to over 6 billion Web pages

The Evolution of the Internet 1961-2010

- History of Internet can be segmented into 3 phases:
 - Innovation Phase – fundamental building blocks conceptualized and realized
 - Institutional Phase – providing funding and legitimization for Internet
 - Commercialization Phase – private corporations take over and expand Internet backbone and services



Stages in the Development of the Internet

YEAR	EVENT	SIGNIFICANCE
<i>INNOVATION PHASE 1961-1974</i>		
1961	Leonard Kleinrock (MIT) publishes a paper on "packet switching" networks.	The concept of packet switching is born.
1961	Lawrence Roberts (MIT) connects a computer in Cambridge to a computer in California using a low-speed data line.	This is the first demonstration of a wide area network ^a using telephone circuits. It demonstrated that computers could retrieve data and run programs remotely (and that the phone system was too noisy and slow for the purpose).
1962	J.C.R. Licklider (MIT) writes memos calling for a "Galactic Network" of computers.	The vision of a global computer network is born.
1963	Licklider heads up Department of Defense (DOD) ARPA ^b network development.	This is the beginning of military interest and funding. ARPA becomes the largest funder of early Internet efforts.
1966	Lawrence Roberts convinces ARPA to fund development of ARPANET using packet switching.	The first effort begins to build a global packet-switched wide-area network.

^aA "wide area network" is a network that connects computers and other devices over distances larger than 1,000 meters. Early mainframe computers had "local" networks connecting hundreds or thousands of dumb terminals usually in the same building (less than 1,000 meters apart) to centralized mainframe computers. These early networks essentially sent keyboard and display commands back and forth from the terminals to the mainframe computers. The new wide area networks proposed in the 1960s were much more powerful: These new networks promised to permit remote computers to transfer entire files, send e-mail messages, and execute programs on a local computer.

^bARPA refers to the Advanced Research Projects Agency of the United States Department of Defense. ARPA is essentially the research and development unit within the Department of Defense; it historically invests in promising new technologies that could have military significance.

YEAR	EVENT	SIGNIFICANCE
1968	ARPA requests quotes from various companies to build packet switches.	The concept of packet switching moves toward physical reality.
1969	The first packet switches are installed at UCLA and Stanford by Bolt, Beranek and Newman (BBN), a defense contractor.	The concept of packet switching is realized in hardware.
1969	The first packet-switched message is sent from UCLA to Stanford.	The communications technology hardware of the Internet is born—the first “Inter Network.” The questions now are: How could this new technology be used? And for what purpose?
1972	E-mail is invented by Ray Tomlinson of BBN. The first ARPANET application is demonstrated at the ICCC ^c conference. Roberts wrote the first e-mail utility program permitting listing, forwarding, and responding to e-mails.	The first “killer app” of the Internet is born.
1973	Bob Metcalfe (XeroxPark Labs) invents Ethernet and local area networks.	Client/server computing is invented. Ethernet permitted the development of local area networks and client/server computing in which thousands of fully functional desktop computers could be connected into a short distance (<1,000 meters) network to share files, run applications, and send messages. Although the Apple and IBM personal computers had not yet been invented, at XeroxPark Labs, the first powerful desktop computers were created in the late 1960s. Xerox’s Ethernet StarNetwork connected these early desktop computers into a functioning office network that could share files, programs, and send messages.
1974	“Open architecture” networking and TCP/IP concepts are presented in a paper by Vint Cerf (Stanford) and Bob Kahn (BBN).	TCP/IP invented. The conceptual foundation for a single common communications protocol that could potentially connect any of thousands of disparate local area networks and computers, and a common addressing scheme for all computers connected to the network, are born. These developments made possible “ peer-to-peer ” “ open ” networking . Prior to this, computers could only communicate if they shared a common proprietary network architecture, e.g., IBM’s System Network Architecture. With TCP/IP, computers and networks could work together regardless of their local operating systems or network protocols.

^cICCC stands for International Computer Communication Conference, one of the first technical engineering groups devoted to communications among computers.

YEAR	EVENT	SIGNIFICANCE
<i>INSTITUTIONAL PHASE 1980–1993</i>		
1980	TCP/IP is officially adopted as the DOD standard communications protocol.	The single largest computing organization in the world adopts TCP/IP and packet-switched network technology.
1980	Personal computers are invented.	Altair, Apple, and IBM personal desktop computers are invented. These computers become the foundation for today's Internet, affording millions of people access to the Internet and the Web.
1983	ARPA creates a separate military network (MILNET) and ARPANET contains only civilian university traffic.	The idea of a "civilian" Internet is born.
1983	Telnet and File Transfer Protocol (FTP) services are deployed.	Telnet permits remote computers to link into a local computer and operate programs. FTP permits easy file transfers on the Internet. These services join e-mail as new "killer apps."
1984	Apple Computer releases the HyperCard program as part of its graphical user interface operating system called Macintosh.	The concept of "hyperlinked" documents and records that permit the user to jump from one page or record to another is commercially introduced.
1986	The National Science Foundation (NSF) adopts the Internet as its interuniversity network.	NSF begins a \$200 million program to develop a university network. It requires all universities receiving NSF funds to make access available campus-wide.
1988	NSF encourages development of private long-haul backbone communication carriers to privatize the Internet.	Private firms such as PSI and UUNet form to handle commercial Internet traffic.
1989	Tim Berners-Lee of the physics lab CERN in Switzerland proposes a worldwide network of hyperlinked documents based on a common markup language called HTML—HyperText Markup Language.	The concept of an Internet-supported service called the World Wide Web based on HTML pages is born. The Web would be constructed from "pages" created in a common markup language, with "hyperlinks" that permitted easy access among the pages. The idea does not catch on rapidly and most Internet users rely on cumbersome FTP and Gopher protocols to find documents.
1990	NSF plans and assumes responsibility for a civilian Internet backbone and creates NSFNET. ^d ARPANET is decommissioned.	The concept of a "civilian" Internet open to all is realized through non-military funding by NSF.
1990	The Internet backbone grows.	By 1990, the backbone had grown from six nodes connected at 56 Kbps to 21 nodes connected at 45 Mbps. 50,000 networks were now connected on all continents, with 29,000 in the United States alone.
1993	The first graphical Web browser called Mosaic is invented by Mark Andreessen and others at the National Center for Supercomputing at the University of Illinois.	Mosaic makes it very easy for ordinary users to connect to HTML documents anywhere on the Web. The browser-enabled Web takes off.

^d"Backbone" refers to the U.S. domestic trunk lines that carry the heavy traffic across the nation, from one metropolitan area to another. Universities are given responsibility for developing their own campus networks that must be connected to the national backbone.

YEAR	EVENT	SIGNIFICANCE
1994	NSF report plans the development of an "information superhighway supporting universities, business and civilians."	Congress and the President's Office propose the creation of a national information superhighway to support research, educational, commercial, and private interests.
1994	Andreesen and Jim Clark form Netscape Corporation.	The first commercial Web browser—Netscape—becomes available.
1994	The first banner advertisements appear on Hotwired.com.	The E-commerce I era begins.
<i>COMMERCIALIZATION PHASE 1995–PRESENT</i>		
1995	NSF privatizes the backbone, and commercial carriers take over backbone operation.	The fully commercial civilian Internet is born. Major long-haul networks such as ATT, Sprint, GTE, UUNet, and MCI take over operation of the backbone. Network Solutions (a private firm) is given a monopoly to assign Internet addresses.
1996	Internet2 Consortium is formed.	Thirty-four government agencies, universities, and business firms plan the development of an Internet 100 to 1,000 times faster than the existing Internet I.
1998	The U.S. federal government encourages the founding of Internet Corporation for Assigning Numbers and Names (ICANN).	Governance over domain names and addresses passes to a private nonprofit international organization.
2002	U.S. Department of Commerce extends its contract with ICANN until September 2003.	Amid growing calls for more government intervention in the governance of the Internet, and growing criticism of ICANN, the private corporation is given new life as an interim measure.
2003	The Internet2 Abilene high-speed network achieves 8 Gbps speeds in a transcontinental test.	A major milestone toward the development of ultra-high-speed transcontinental networks several times faster than the existing backbone is achieved.

Table-- Development of the Internet Timeline

3.2 The Internet: Key Technology Concepts

- Federal Networking Council definition of Internet highlights three important concepts that are basis for understanding the Internet:
 - Packet switching
 - TCP/IP communications protocol
 - Client/server computing

Resolution of the Federal Networking Council

"The Federal Networking Council (FNC) agrees that the following language reflects our definition of the term 'Internet.'

'Internet' refers to the global information system that—

- (i) is logically linked together by a globally unique address space based on the Internet Protocol (IP) or its subsequent extensions/follow-ons;
- (ii) is able to support communications using the Transmission Control Protocol/Internet Protocol (TCP/IP) suite or its subsequent extensions/follow-ons, and/or other IP-compatible protocols; and
- (iii) provides, uses or makes accessible, either publicly or privately, high level services layered on the communications and related infrastructure described herein."

Last modified on October 30, 1995.

3.2.1 Packet Switching

- A method of slicing digital messages into packets, sending the packets along different communication paths as they become available, and then reassembling the packets once they arrive at their destination
- It uses routers: special purpose computers that interconnect the computer networks that make up the Internet and route packets to their ultimate destination
- Routers use computer programs called routing algorithms to ensure packets take the best available path toward their destination

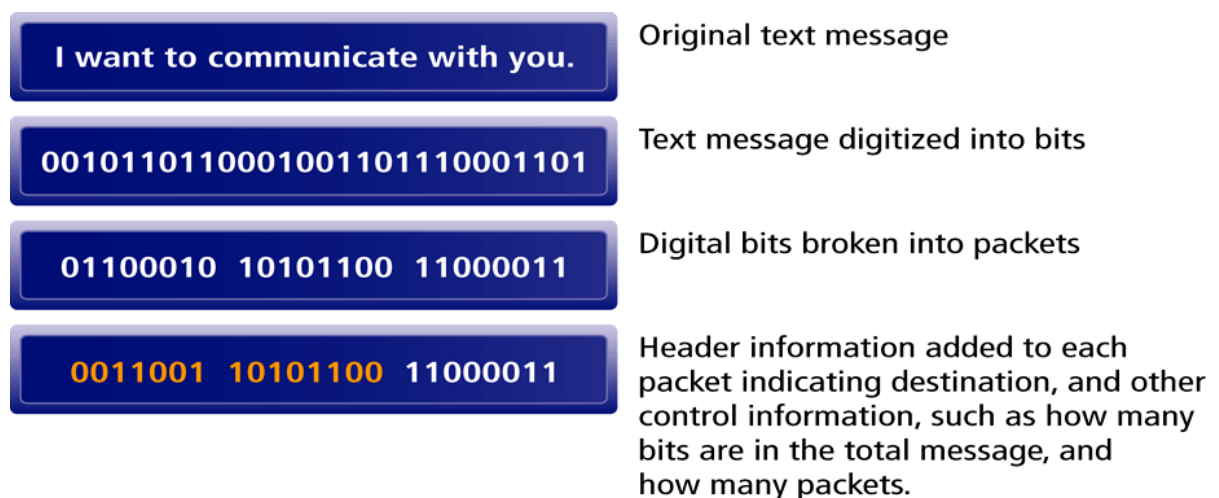


Figure 3.1—Packet Switching

3.2.2 TCP/IP (Transmission Control Protocol/Internet Protocol)

- Protocol: a set of rules for formatting, ordering, compressing and error-checking messages
- TCP: Establishes the connections among sending and receiving Web computers, handles the assembly of packets at the point of transmission, and then reassembly at the receiving end
- IP: Provides the Internet's addressing scheme
- TCP/IP is divided into 4 separate layers:
 - Network Interface Layer
 - Internet Layer
 - Transport Layer
 - Application Layer

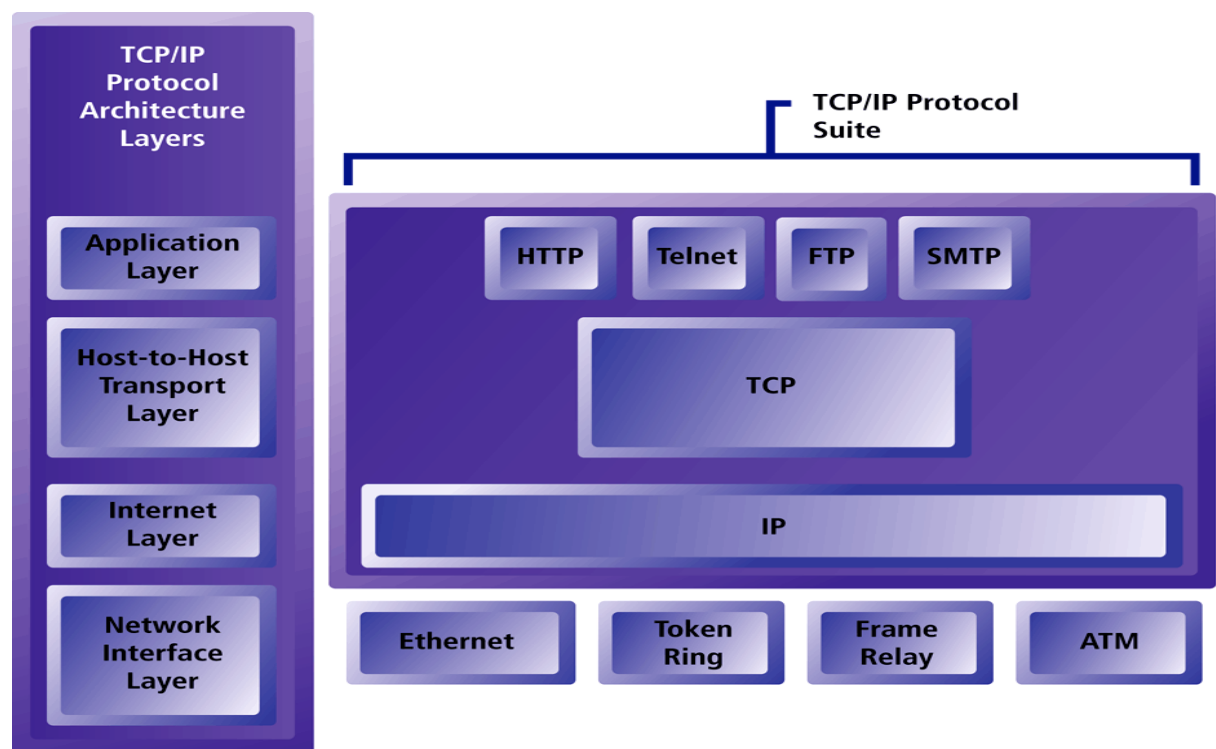


Figure 3.2-- The TCP/IP Architecture and Protocol Suite

IP Addresses

- Internet address (also called IP address): a 32-bit number expressed as a series of four separate numbers marked off by periods, such as 201.61.186.227
- IPv4 the current version of IP. Can handle up to 4 billion addresses
- IPv6 (next generation of IP) will use 128-bit addresses and be able to handle up to 1 quadrillion addresses

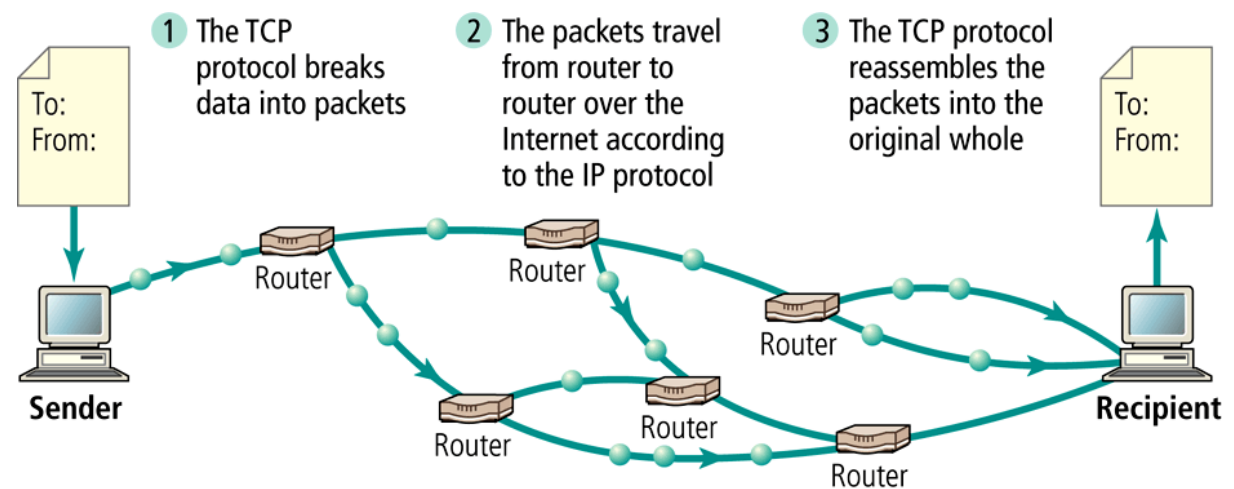


Figure 3.3--Routing Internet Messages: TCP/IP and Packet Switching

3.2.3 Domain Names and URLs

- Domain name: IP address expressed in natural language
- Domain name system (DNS): allows numeric IP addresses to be expressed in natural language
 - Example: cnet.com = 216.200.247.134
- Uniform resource locator (URL): addresses used by Web browsers to identify location of content on the Web

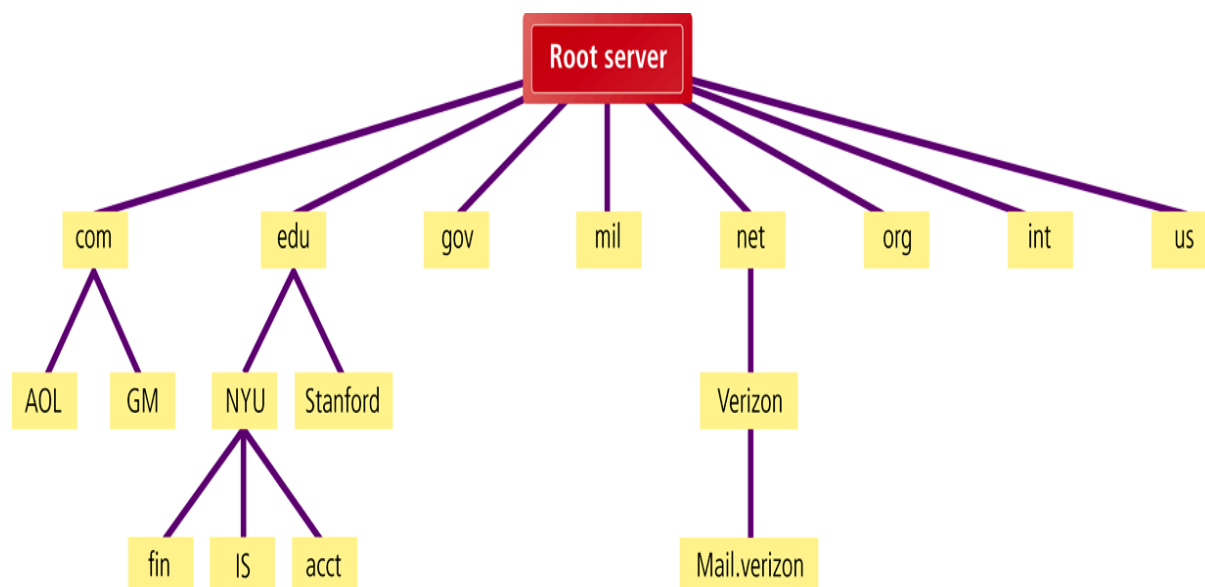


Figure 3.4-- The Hierarchical Domain Name System

IP addresses	Every computer connected to the Internet must have a unique address number called an <i>Internet Protocol address</i> . Even computers using a modem are assigned a temporary IP address.
Domain names	The DNS (domain name system) allows expressions such as aw.com (Addison Wesley's Web site) to stand for numeric IP locations.
DNS servers	DNS servers are databases that keep track of IP addresses and domain names on the Internet.
Root servers	Root servers are central directories that list all domain names currently in use for specific domains; for example, the .com root server. DNS servers consult root servers to look up unfamiliar domain names when routing traffic.
ICANN	The Internet Corporation for Assigned Numbers and Names (ICANN) was established in 1998 to set the rules for domain names and IP addresses and also to coordinate the operation of root servers. It took over from private firms such as Network Solutions.

Table 3.1-- Pieces of the Internet Puzzle: Names and Addresses

3.2.4 Client/Server Computing

- Model of computing in which very powerful personal computers (clients) are connected in a network with one or more server computers that perform common functions for the clients, such as storing files, software applications, etc.

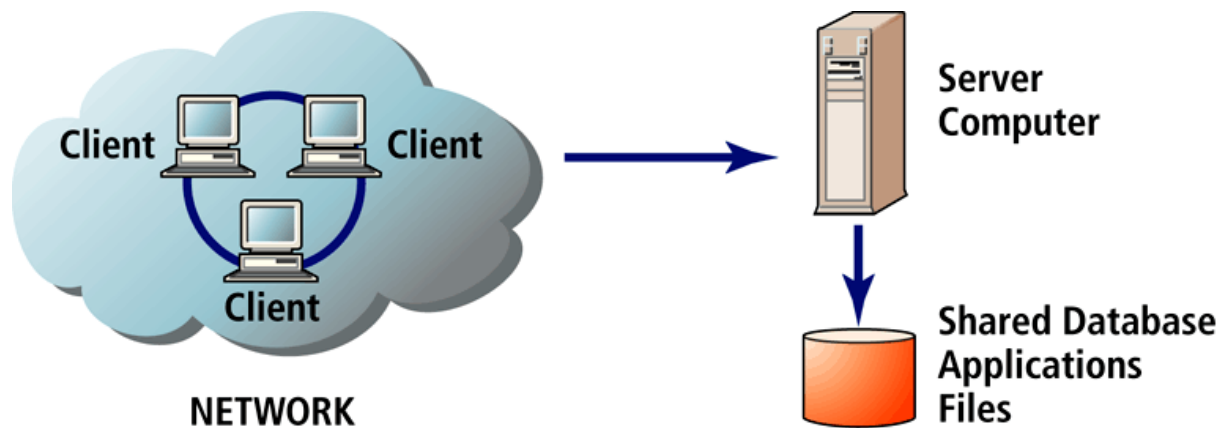


Figure 3.5-- The Client/Server Computing Model

3.3 Other Internet Protocols and Utility Programs

- HTTP: Protocol used to transfer Web pages
- SMTP, POP and IMAP: Protocols used to send and receive e-mail
- FTP: Protocol that permits users to transfer files from server to client and vice versa
- SSL: Protocol that provides secure communications between client and server
- Telnet: Program that enables a client to emulate a mainframe computer terminal
- Finger: Utility program that lets you check who is logged on, for how long and user name
- Ping: Utility program that allows you to check connection between client and server
- Tracert: Utility program that allows you to follow path of a message sent from a client to a remote computer

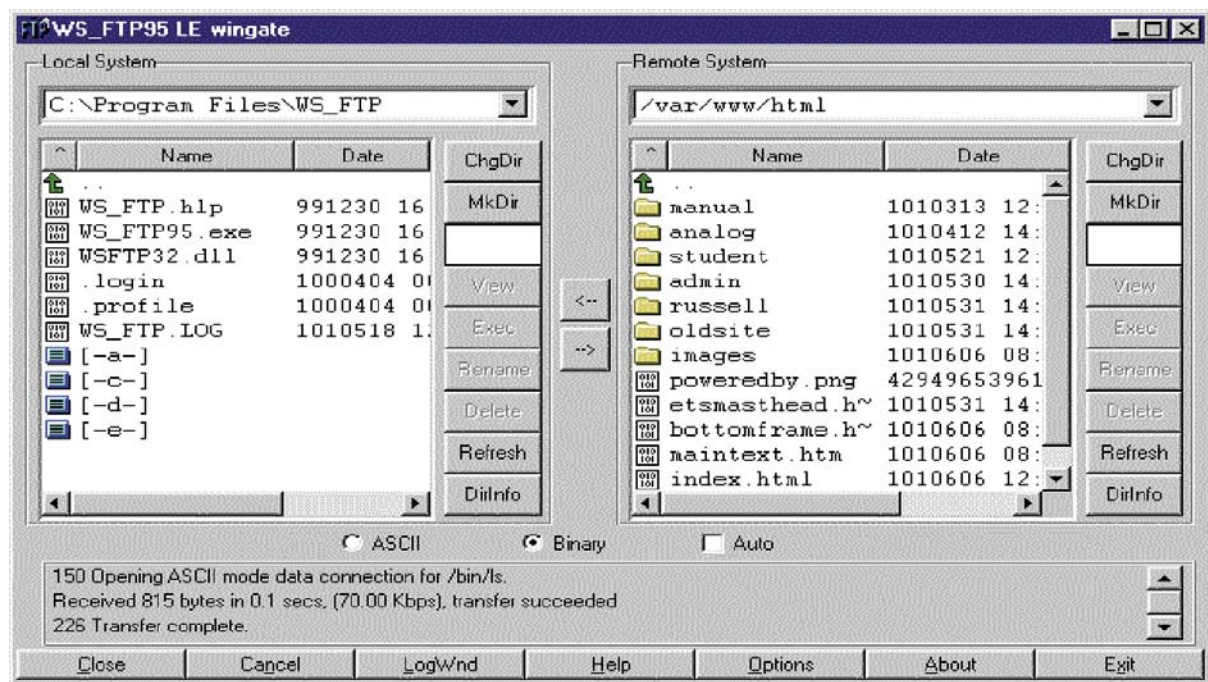


Figure 3.6-- Sample FTP Session.

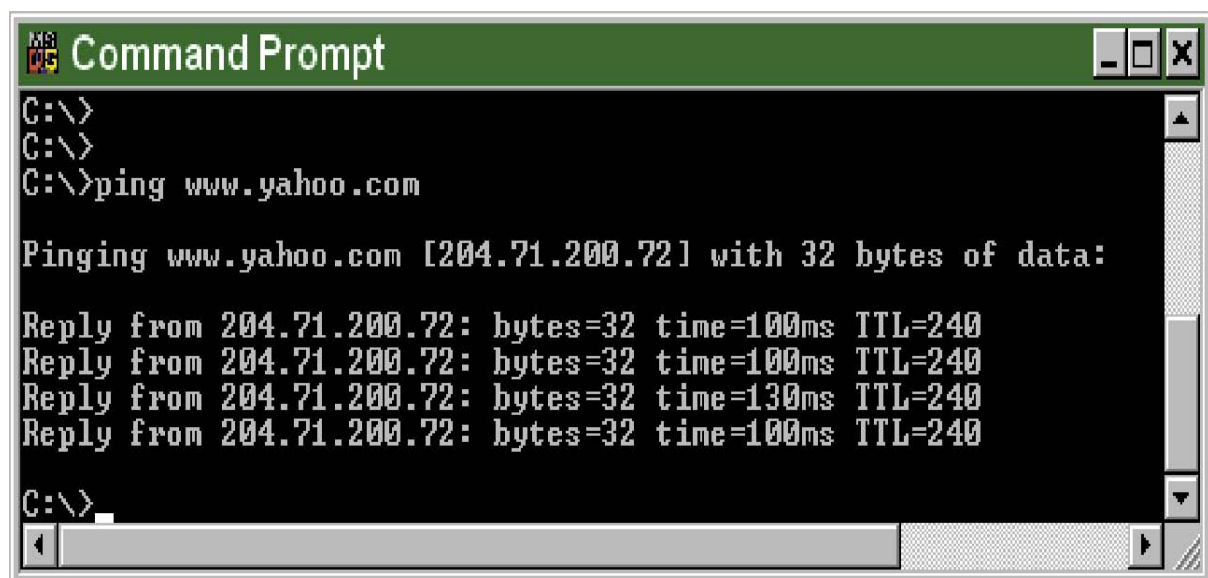


Figure 3.7—Result of a ping.

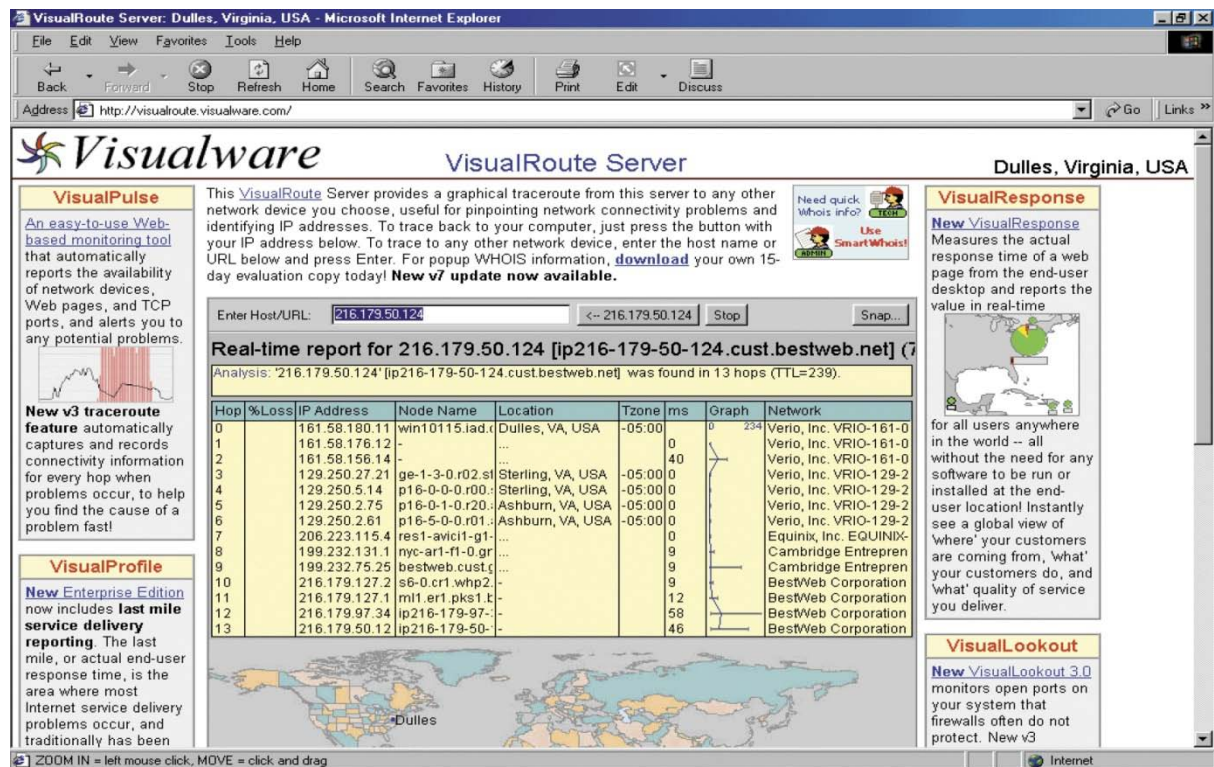


Figure 3.8-- Tracing the Route a Message.

3.4 The Internet Today

- Client/server computing model, coupled with hourglass, has allowed Internet to handle explosive growth without disruption
- Hourglass/layered architecture has 4 layers:
 - Network Technology Substrate
 - Transport Services and Representation Standards
 - Middleware Services
 - Applications

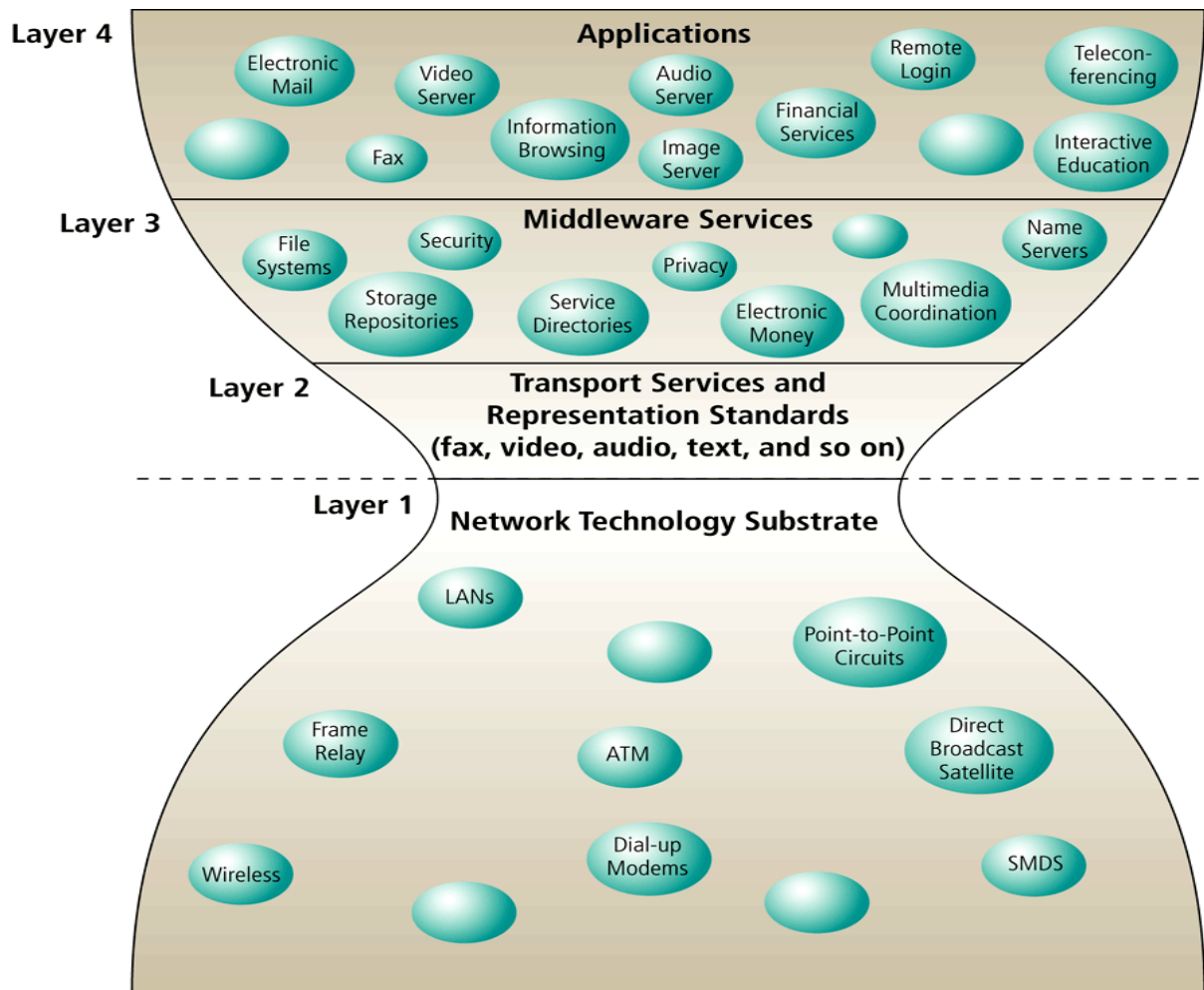


Figure 3.9-- The Hourglass Model of the Internet

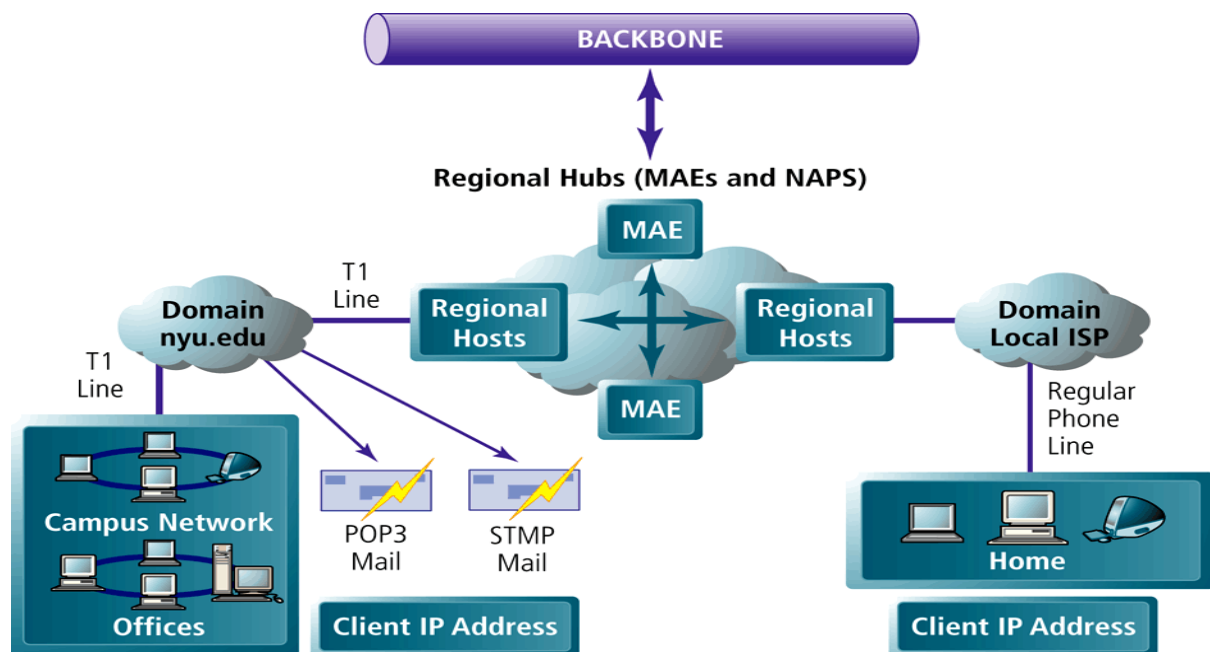


Figure 3.10—Internet network architecture

The Internet Backbone

- Consists of high-bandwidth fiber-optic cable owned by a variety of Network Service Providers (NSPs)
- Term bandwidth refers to how much data can be transferred over the communications media within a fixed period of time
- May be expressed bits per second (bps), kilobits per second (Kbps), megabits per second (Mbps) or gigabits per second (Gbps)

NAPs, MAEs and CANs

- Hubs where backbones intersect with regional and local networks, and where backbone owners connect with one another called Network Access Points (NAPs) or Metropolitan Access Exchanges (MAEs).
- Campus area network (CAN): Local area network operating within a single organization that leases Internet access directly from regional or national carrier

Internet Service Providers (ISPs)

- Leases Internet access to home owners, small businesses and some large institutions
- Retail providers that deal with “last mile of service”
- Major international ISPs include AOL, MSN, and AT&T Worldwide.
- Offer both narrowband (traditional telephone modem connection at 56.6 Kbps) and broadband (service based on DSL, cable modem, T1 or T3 telephone lines, and satellite)

Broadband Service Choices

- Digital Subscriber Line (DSL): Telephone technology delivers high-speed access through ordinary telephone lines; speeds from about 385 Kbps to 1.5 Mbps
- Cable modem: Cable television technology piggybacks digital access to Internet on top of analog video cable line; speeds from about 500 Kbps to 2 Mbps
- T1 and T3: International telephone standards for digital communication that offer guaranteed delivery rates
 - T1: 1.54 Mbps
 - T3: 43 Mbps

- Satellite: high-speed downloads (256 Kbps to 1 Mbps), but no upload available

TYPE OF INTERNET SERVICE	TIME TO DOWNLOAD
<i>NARROWBAND SERVICES</i>	
Telephone modem	25 minutes
<i>BROADBAND SERVICES</i>	
DSL	3.5 minutes
Cable modem	3.5 minutes
T-1	51 seconds
T-3	2 seconds

Table 3.2-- Time to Download a 10 Megabyte File by Type of Internet Service

Intranets and Extranets

- Intranet: TCP/IP network located within a single organization for purposes of communication and information processing
- Extranet: Formed when firms permit outsiders to access their internal TCP/IP networks

Who Governs the Internet?

- A number of different organizations that influence Internet and monitor its operations including:

Internet Architecture Board (IAB)

Internet Corporation for Assigned Names and Numbers (ICANN)

Internet Engineering Steering Group (IESG)

Internet Engineering Task Force (IETF)

Internet Society (ISOC)

World Wide Web Consortium (W3C)

3.5 Internet II: The Future Infrastructure

- Internet II: The second era of the Internet that is being built today by private corporations, universities and government agencies.

Limitations of Internet I

- To appreciate potential benefits of Internet II, we must understand the limitations of Internet's current infrastructure:

Bandwidth limitations

Quality of service limitations

Network architecture limitations

Language development limitations

Wired Internet limitations

Areas of Focus of Internet II

- Advanced network infrastructure: New backbone networks that interconnect GigaPoPs used by Internet2 members to access network
- New networking capabilities: Projects include
 - Deploying IPv6
 - Developing and implementing new QOS technologies
 - Developing more effective routing practices
 - Coordinating the interconnection of different components of the Internet2 infrastructure
 - Creating an infrastructure to handle multicasting
- Middleware: incorporating identification, authentication, authorization, directory and security services into standardized middleware
- Advanced applications: distributed computation, virtual labs, digital libraries, distributed learning, tele-immersion

Benefits of Internet II Technologies

- IP Multicasting – set of technologies that enables efficient delivery of data to many locations on a network
- Latency solutions – diffserve (differentiated quality of service) will be able to assign different levels of priority to packets depending on type of data being transmitted
- Guaranteed service levels – ability to purchase right to move data through network at guaranteed speed in return for higher fee
- Lower error rates
- Declining costs

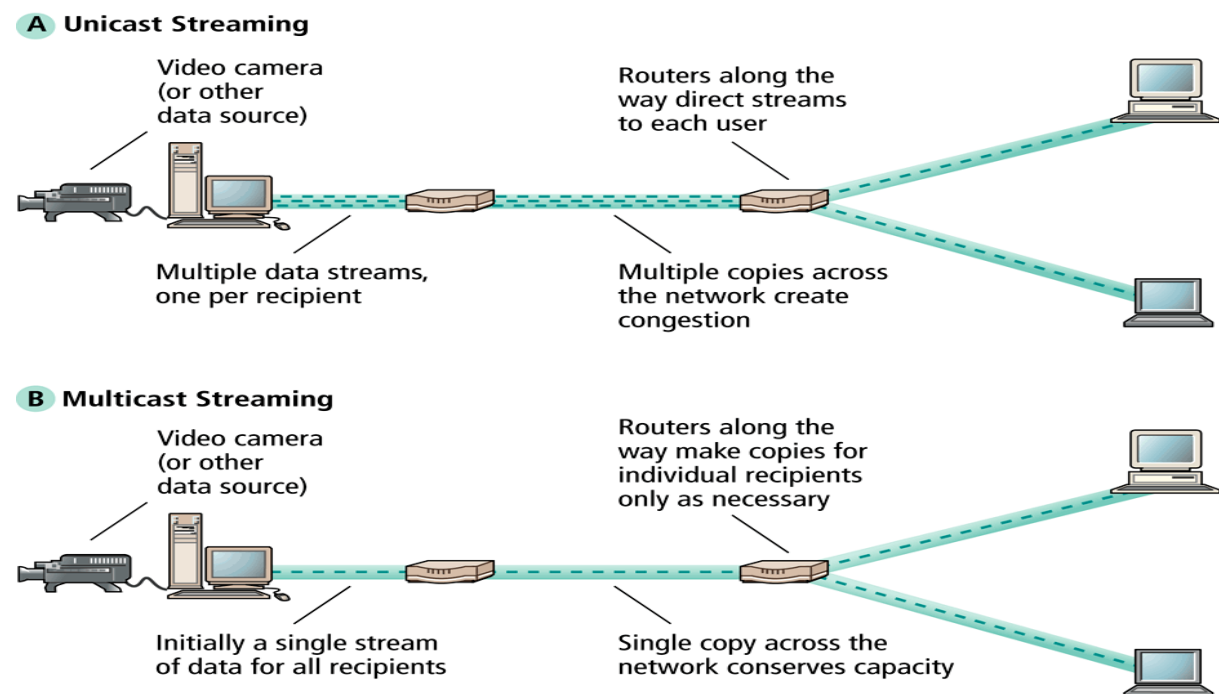


Figure 3.11-- IP Multicasting

3.6 Development of the Web

- 1989-1991: Web invented by Tim Berners-Lee at European Particle Physics Laboratory (CERN)
- 1993: Marc Andreessen and others at NCSA create Mosaic, a Web browser with a graphical user interface that could run on Windows, Macintosh, or Unix computer
- 1994: Andreessen and Jim Clark found Netscape, and create first commercial Web browser, Netscape Navigator

- August 1995: Microsoft introduces its version of Web browser, Internet Explorer

Hypertext

- A way of formatting pages with embedded links that connect documents to one another, and that also link pages to other objects such as sound, video or animation files
- Uses Hypertext Transfer Protocol (HTTP) and URLs to locate resources on the Web

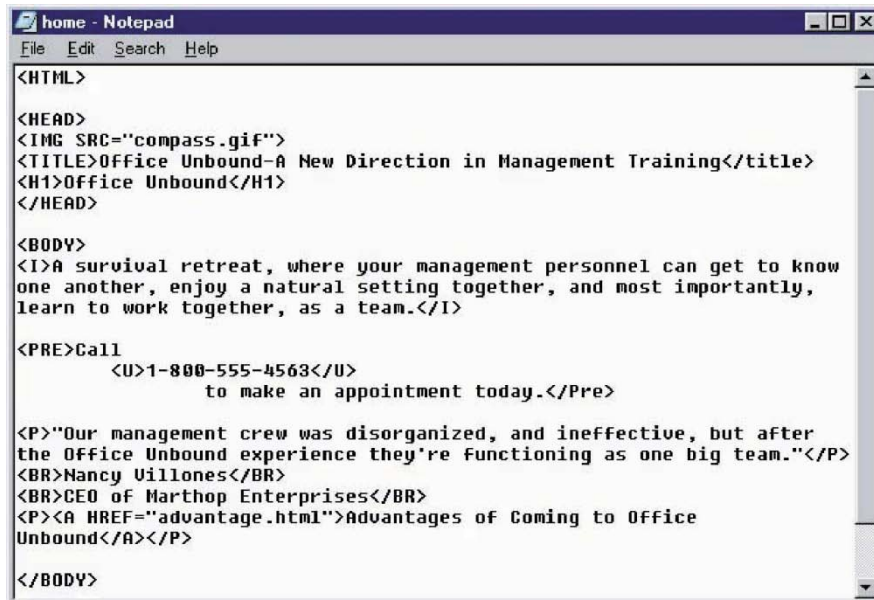
3.6.1 Markup Languages

- Generalized Markup Languages (GMLs) include:

Standard Generalized Markup Language (SGML) – an early GML

Hypertext Markup Language (HTML) – a GML that is relatively easy to use; provides fixed set of markup “tags” used to format a Web page

eXtensible Markup Language (XML) – new markup language specification developed by W3C that is designed to describe data and information; tags used are defined by user



```
home - Notepad
File Edit Search Help
<HTML>
<HEAD>
<IMG SRC="compass.gif">
<TITLE>Office Unbound-A New Direction in Management Training</title>
<H1>Office Unbound</H1>
</HEAD>
<BODY>
<I>A survival retreat, where your management personnel can get to know
one another, enjoy a natural setting together, and most importantly,
learn to work together, as a team.</I>
<PRE>Call
    <U>1-800-555-4563</U>
    to make an appointment today.</Pre>
<P>"Our management crew was disorganized, and ineffective, but after
the Office Unbound experience they're functioning as one big team."</P>
<BR>Nancy Villones</BR>
<BR>CEO of Marthop Enterprises</BR>
<P><A HREF="advantage.html">Advantages of Coming to Office
Unbound</A></P>
</BODY>
```

Figure 3.12—Example HTML code

SOFTWARE TOOL	COMMENTS
Text editor, such as Notepad or Wordpad	Suitable for creating simple Web pages, text.
FrontPage	Strong candidate for Web page creation, design, and site management tools. Good at creating and integrating graphics and other objects.
Dreamweaver	Professional Web page and site development tool. Good at creating graphics, animations, and other special effects.

Table 3.3—HTML tools

Sample XML Code <pre><?xml version="1.0"?> <note> <to>George</to> <from>Carol</from> <heading>Just a Reminder</heading> <body>Don't forget to order the groceries from FreshDirect!</body> </note></pre>

SOURCE: www.xml101.com/xml

Figure 3.13—Example XML code

3.6.2 Web Servers and Web Clients

- Web server software: Enables a computer to deliver Web pages written in HTML or XML to clients on network that request this service by sending an HTTP request
- Leading brands: Apache and Microsoft
- Basic capabilities: Security services, FTP, search engine, data capture
- Term Web server also used to refer to physical computer that runs Web server software
- Specialized types include database servers, ad servers, mail servers, video servers
- Web client: Any computing device attached to the Internet that is capable of making HTTP requests and displaying HTML pages

Web Browsers

- Primary purpose to display Web pages.
- Internet Explorer and Netscape Navigator dominate the market (94%)
- Other browsers include:
 - Opera
 - Safari (for Apple Macintosh)
 - NeoPlanet

3.7 The Internet and Web: Features

- Internet and Web features on which the foundations of e-commerce are built include:

E-mail

Instant messaging

Search engines

Intelligent agents (bots)

Chat

Music, video and other standard files

Streaming media

Cookies

E-mail

- Most used application of the Internet
- Uses a series of protocols to enable messages containing text, images, sound, video clips, etc to be transferred from one Internet user to another
- Also allows attachments (files attached to the e-mail message)
- Can be an effective marketing tool
- Spam: unsolicited e-mail. A worsening problem

Instant Messaging

- Fastest growing form of online human communication
- Displays words type on a computer almost instantly, and recipients can then respond immediately in the same way
- Different proprietary systems offered by AOL, MSN, Yahoo

Search Engines

- Identifies Web pages that appear to match keywords (queries) entered by a user, and provides list of best matches based on one or more of a variety of techniques
- No longer simply search engines, but also shopping tools and advertising vehicles (search engine marketing)

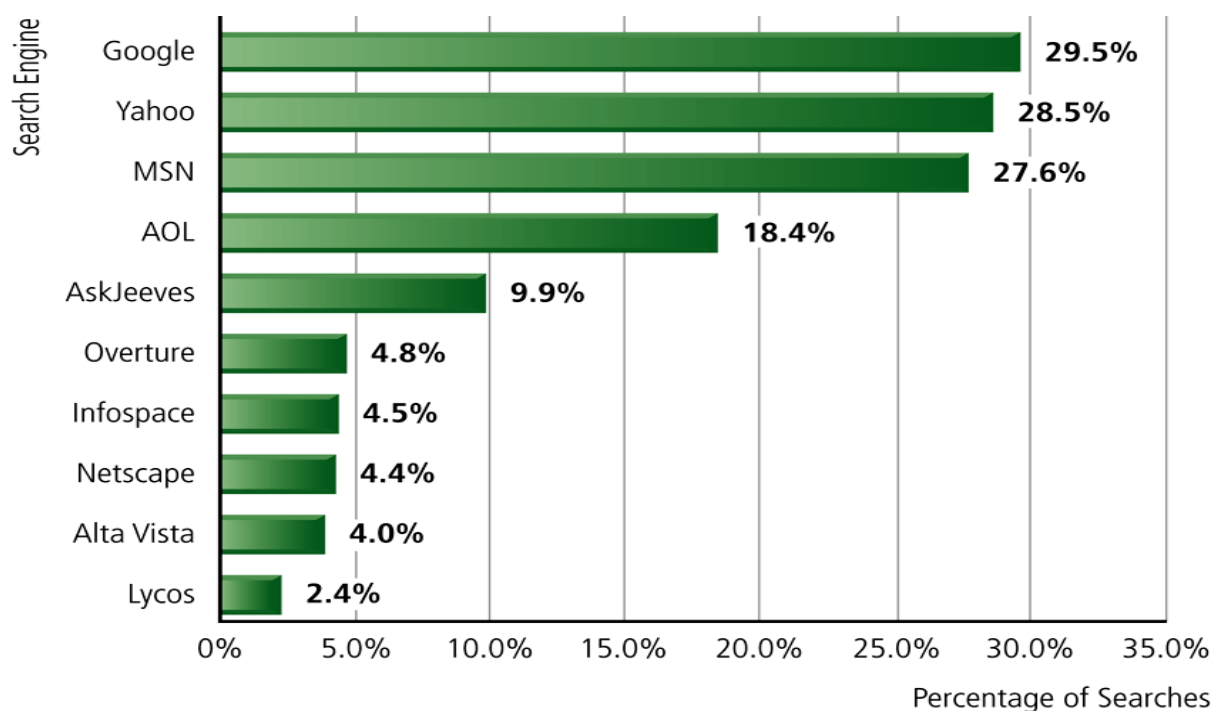


Figure 3.14-- Top Ten Search Engines

Intelligent Agents (Bots)

- Software programs that gather and/or filter information on a specific topic and then provide a list of results
- Types include search bot, shopping bot, Web monitoring bot, news bot, chatterbot

3.8 Other Internet and Web Features Relevant to E-commerce

- Chat: Enables users to communicate via computer in real time (simultaneously); used in e-commerce to help develop community
- Music, video, and other standard files: routinely used for marketing and advertising purposes
- Streaming media: enables music, video and other large files to be sent to users in chunks so that when received and played, file comes through uninterrupted
- Cookies: small text file stored on user's computer with information about the user that can be accessed by Web site the next time user returns to the site

3.9 Internet II and E-commerce: Other Emerging Features and Services

- Digital libraries
- Distributed storage:
- Distance learning
- Digital video
- Video conferencing
- Tele-immersion
- M-commerce applications

Chapter IV

Building An E-commerce Website

Learning Objectives:

- Explain the process that should be followed in building an e-commerce Web site
- Describe the major issues surrounding the decision to outsource development and/or hosting
- Identify and understand the major considerations involved in choosing server and e-commerce merchant server software
- Understand the issues involved in choosing the most appropriate hardware for an e-commerce site
- Identify additional tools that can improve Web site performance

4.1 Right-Sizing a Web Site? Use a Simulator

- Web site simulators such as IBM's High Volume Web Site (HVWS) Simulator can help answer such questions as
 - How many Web servers does your site require
 - How many CPUs should each server have
 - How powerful does the site's database server need to be
 - What kind of connection speed do you need to the Internet
- The HVWS Simulator uses a queuing model that estimates the performance and capacity of a Web site based on workload patterns, performance objectives and specific hardware and software.

High Volume Web Sites Simulator Version 4.0.3 for WebSphere - project1

File Window Help

IBM WebSphere High Volume Web Sites Simulator

Business Pattern | Objectives | Hardware Topology | Software

Online Activities

Business Pattern

- ☒ Online Shopping
- ☐ Online Trading(Trivial)
- ☐ Online Banking
- ☐ Reservation system
- ☐ Inventory management
- ☐ Online Brokerage(Complex)
- ☐ Online Auction
- ☐ WP 2.1
- ☐ WP 4.1
- ☐ Business to Business
- ☐ **PERVASIVE - WP 4.1**
- ☐ **USER DEFINED**

Interactions per User Session

	Percentage(%)	Page View	Think time(min)
Browse Only	83	4	0.5
Product Search	15	2	0.5
Buy	2	12	0.5

Burst to Peak Ratio

Total page views per user visit(session) 3.86

Total think time per user visit(session) 1.93 minutes

Pattern Diagram Definition

Calculate Results Graph Results Reset Help

For Help, press F1

Figure 4.1-- Simulator

4.2 Building an E-commerce Site: A Systematic Approach

- Two most important management challenges in building a successful e-commerce site are:
 - Developing a clear understanding of business objectives
 - Knowing how to choose the right technology to achieve those objectives

4.2.1 Pieces of the Site-Building Puzzle

- Main areas where you will need to make decisions in building a site include:
 - Human resources and organizational capabilities – creating a team that has the skill set to build and manage a successful site
 - Hardware
 - Software
 - Telecommunications
 - Site design

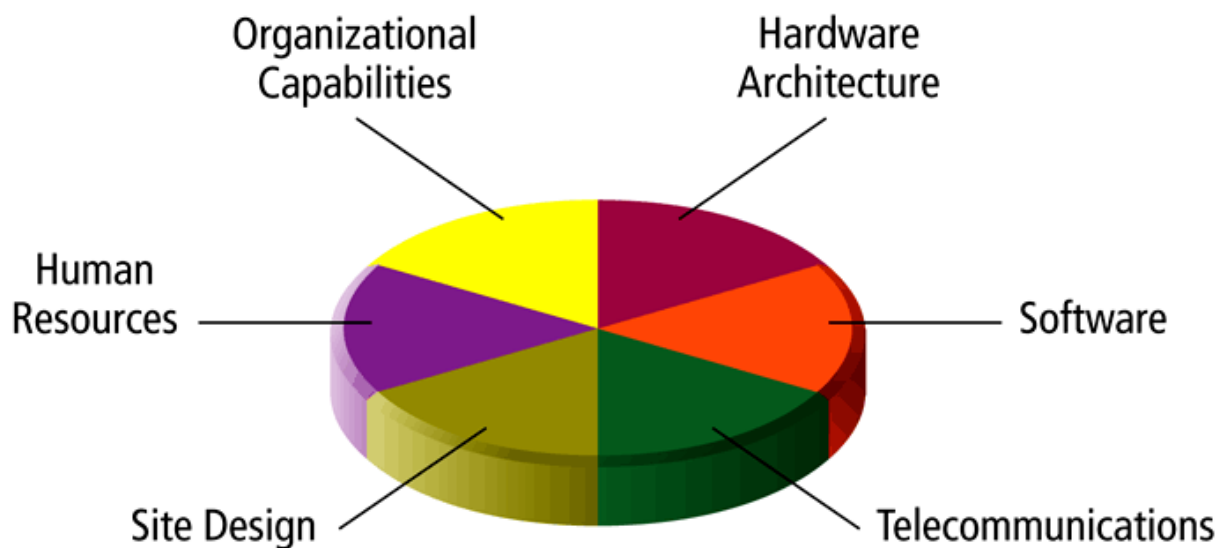


Figure 4.2-- Pieces of the E-commerce Site-Building Puzzle

4.2.2 The Systems Development Life Cycle

- Systems Development Life Cycle (SDLC) is a methodology for understanding the business objectives of a system and designing an appropriate solution
- Five major steps in the SDLC are:

- Systems analysis/planning
- Systems design
- Building the system
- Testing
- Implementation

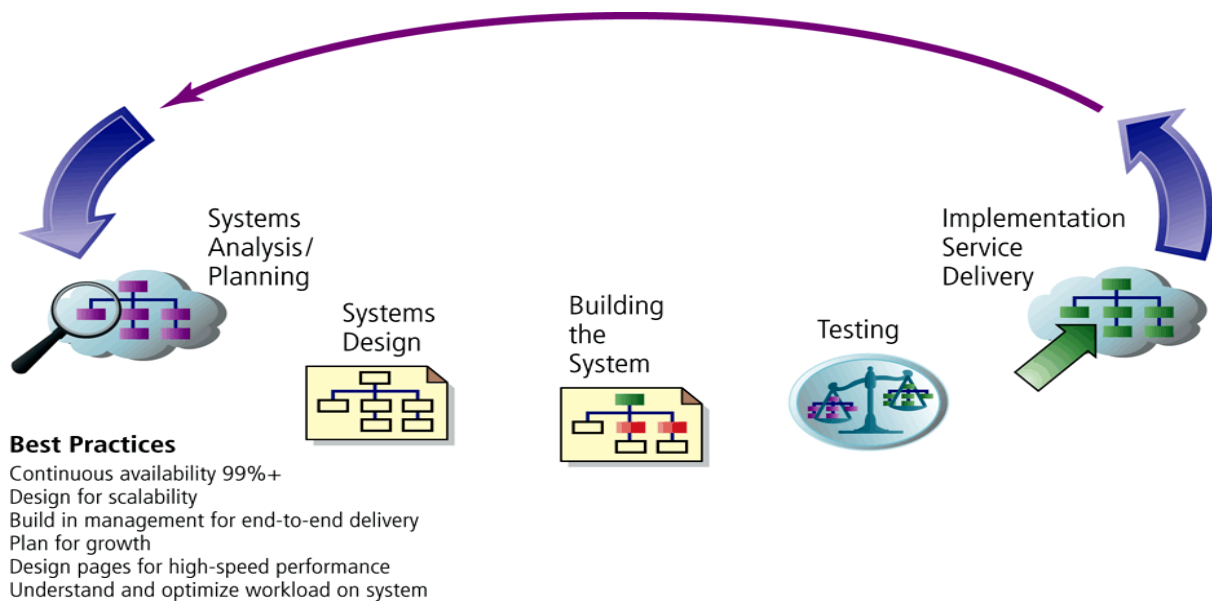


Figure 4.3-- Web Site Systems Development Life Cycle

System Analysis/Planning: Identifying Business Objectives, System Functionality, and Information Requirements

- Business objectives: a list of capabilities you want your site to have
- System functionalities: a list of the types of information system capabilities you will need to achieve your business objectives
- Information requirements: the information elements that the system must produce in order to achieve the business objectives

BUSINESS OBJECTIVE	SYSTEM FUNCTIONALITY	INFORMATION REQUIREMENTS
Display goods	Digital catalog	Dynamic text and graphics catalog
Provide product information (content)	Product database	Product description, stocking numbers, inventory levels
Personalize/customize product	Customer on-site tracking	Site log for every customer visit; data mining capability to identify common customer paths and appropriate responses
Execute a transaction	Shopping cart/payment system	Secure credit card clearing; multiple payment options
Accumulate customer information	Customer database	Name, address, phone, and e-mail for all customers; online customer registration
Provide after-sale customer support	Sales database	Customer ID, product, date, payment, shipment date
Coordinate marketing/advertising program	Ad server, e-mail server, e-mail campaign manager, ad banner manager	Site behavior log of prospects and customers linked to e-mail and banner ad campaigns
Understand marketing effectiveness	Site tracking and reporting system	Number of unique visitors, pages visited, products purchased, identified by marketing campaign
Provide production and supplier links	Inventory management system	Product and inventory levels, supplier ID and contact, order quantity data by product

Table 4.1-- Business Objectives, System Functionality, and Information Requirements for a Typical E-commerce Site

Systems Design: Hardware and Software Platforms

- System design specification: a description of the main components of a system and their relationship to one another.
- System design can be broken down into two parts:
 - Logical design includes:
 - Dataflow diagram that describes the flow of information at the site, processing functions that must be performed, and databases that will be used
 - Description of the security and emergency backup systems, and controls that will be used
 - Physical design: translate the logical design into physical components

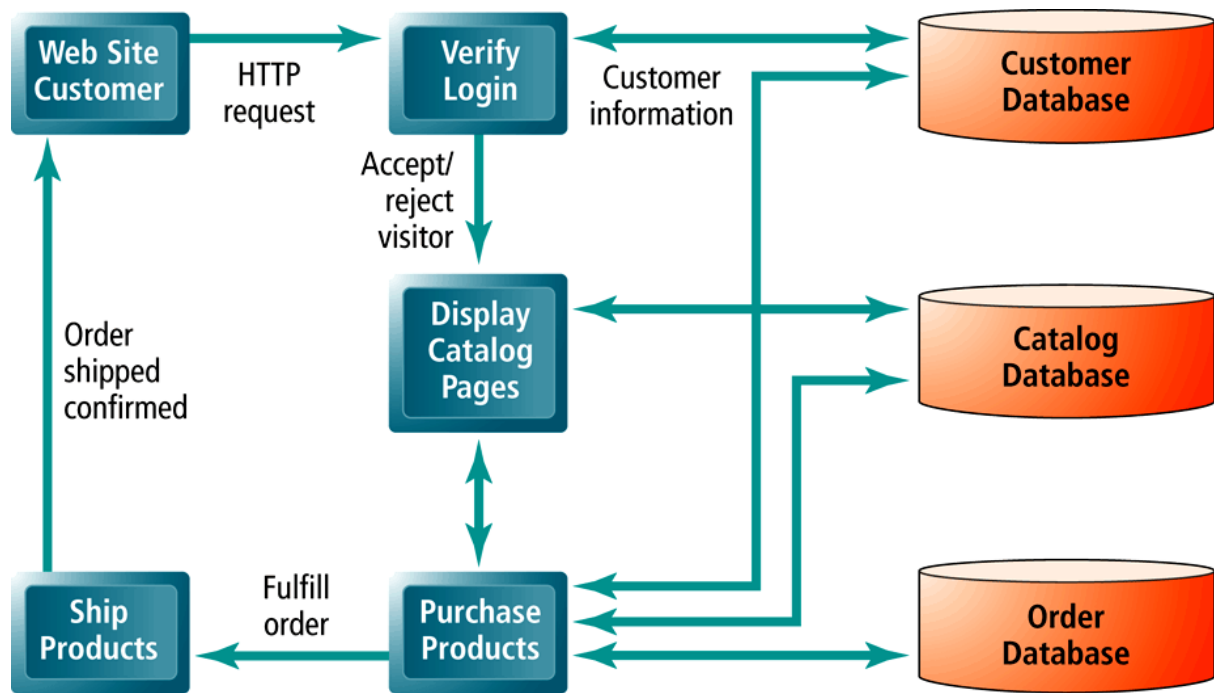


Figure 4.4-- A Logical Design for a Simple Web Site

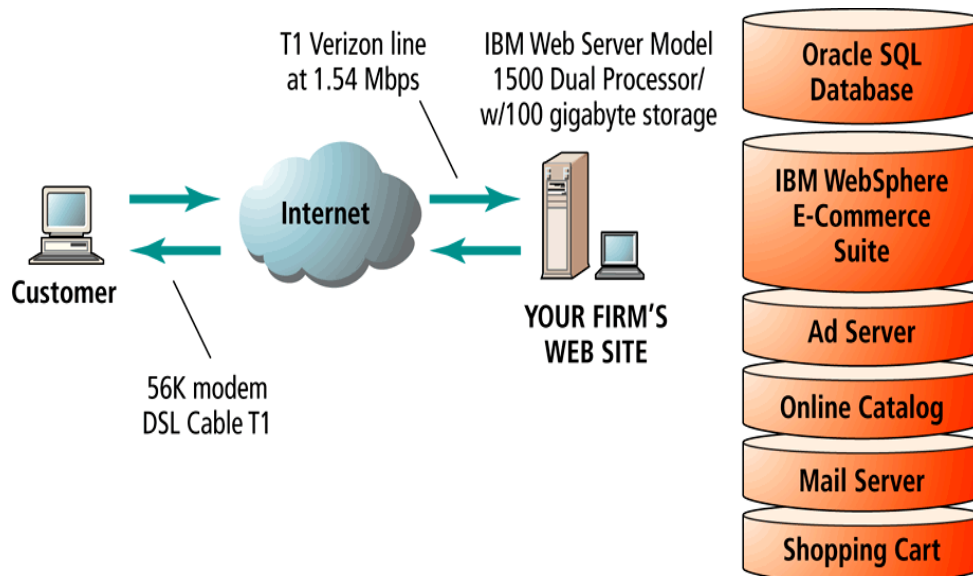


Figure 4.5--A Physical Design for a Simple Web Site

Building the System: In-House versus Outsourcing

- Outsourcing: hiring an outside vendor to provide services involved in building the site
- Build your own versus outsourcing decision:
 - Build your own requires team with diverse skill set; choice of software tools; both risks and possible benefits

- Host your own versus outsourcing

- Hosting: hosting company is responsible for ensuring site is accessible 24/7, for monthly fee
- Co-location: firm purchases or leases a Web server (with control over its operation), but server is located in at vendor's physical facility

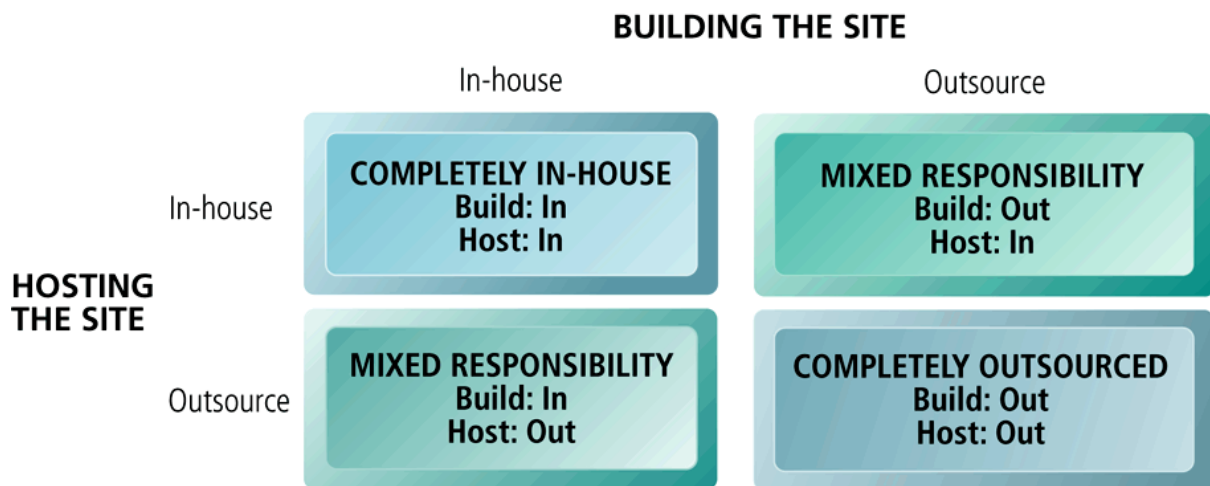


Figure 4.6-- Choices in Building and Hosting



Figure 4.7-- The Spectrum of Tools for Building Your Own E-commerce Site

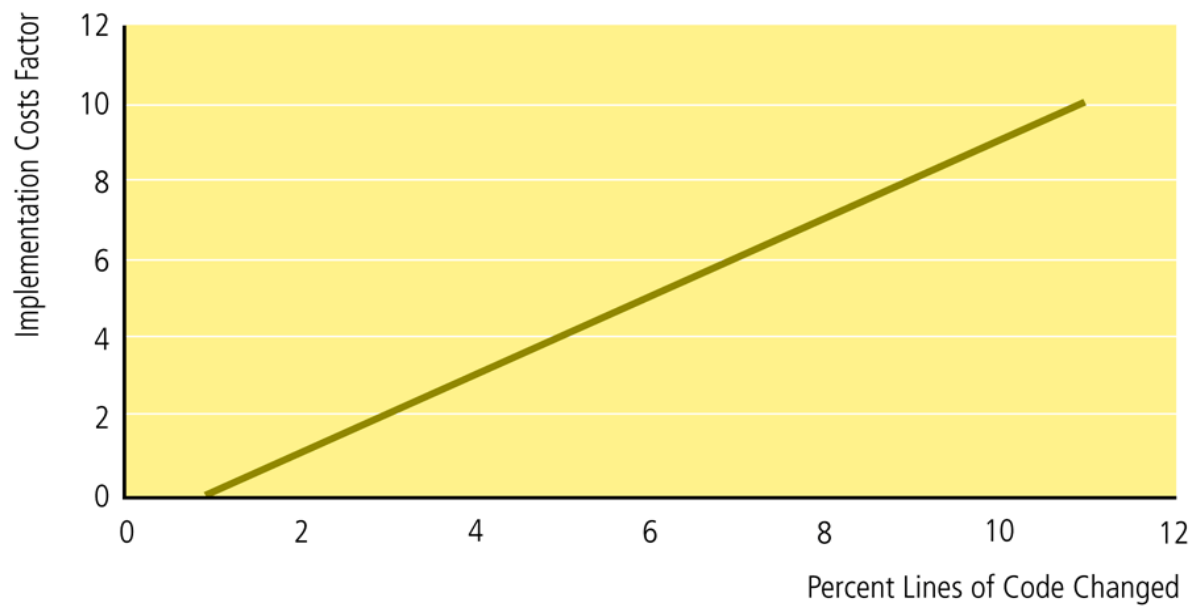


Figure 4.8-- Costs of Customizing E-commerce Packages

Cable and Wireless	Qwest Communications
Equinex	NTT/Verio
IBM Global Services	Rackspace

Table 4.2-- Key Players: Hosting/Co-location Services

Testing, Implementation and Maintenance

- Testing:
 - Includes unit testing, system testing and acceptance testing
- Implementation and maintenance:
 - Maintenance is ongoing, with 20% of time devoted to debugging code and responding to emergency situations, 20% with changing reports, data files and links to backend databases; and 60% to general administration and making changes and enhancements to system
 - Benchmarking: process by which site is compared to those of competitors in terms of response speed, quality of layout and design

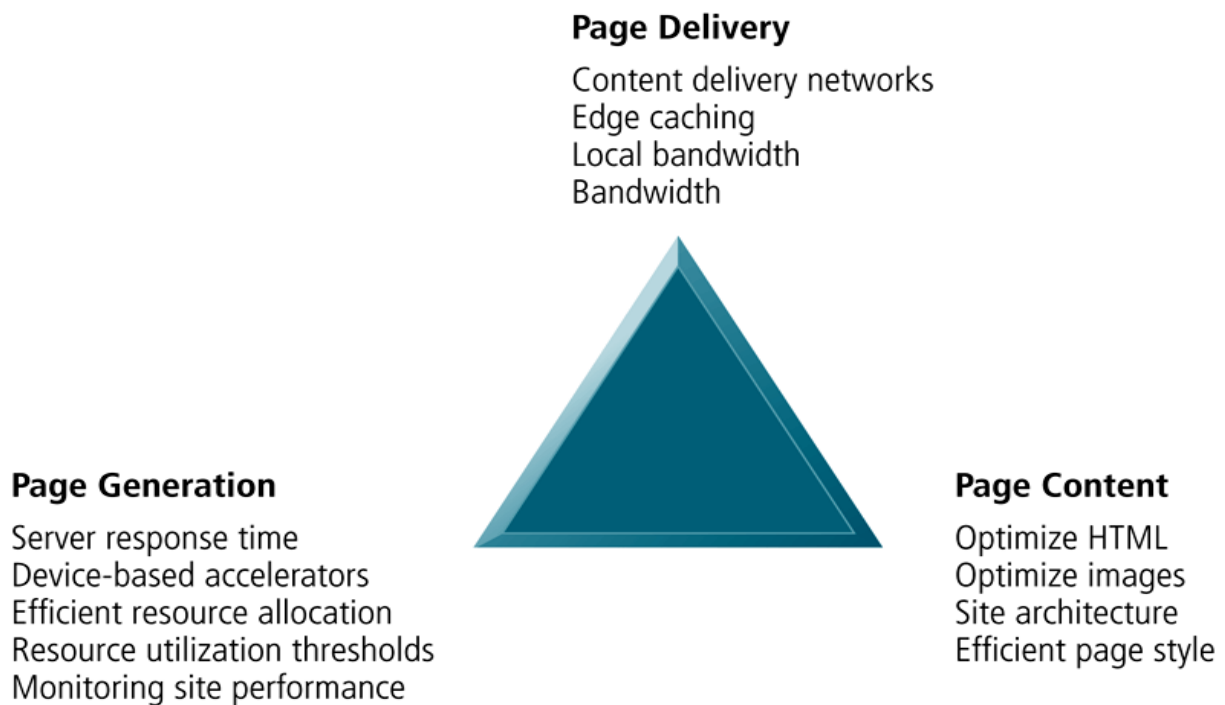


Figure 4.9-- Factors in Web Site Optimization

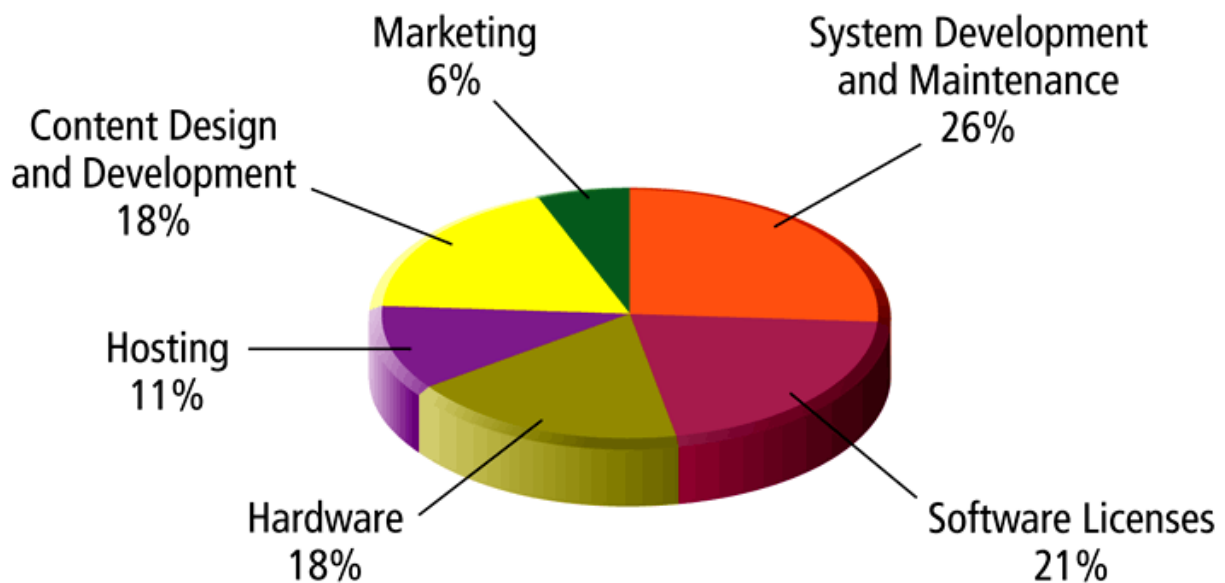
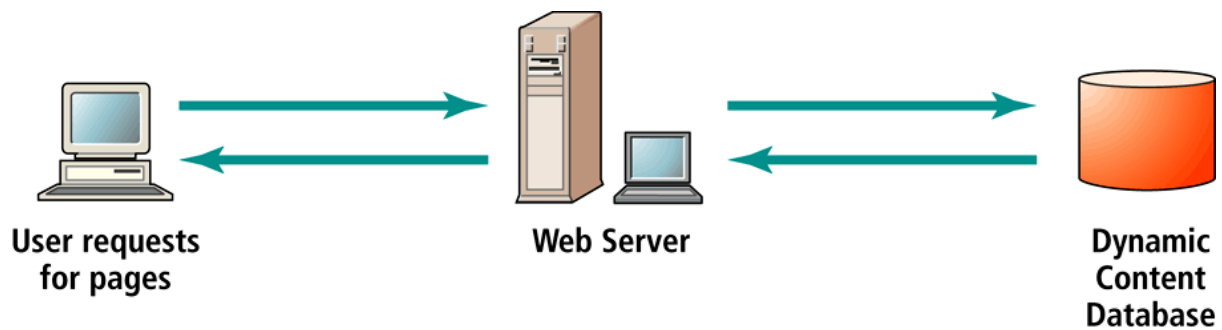


Figure 4.10-- Components of a Web Site Budget

4.3 Simple versus Multi-tiered Web Site Architecture

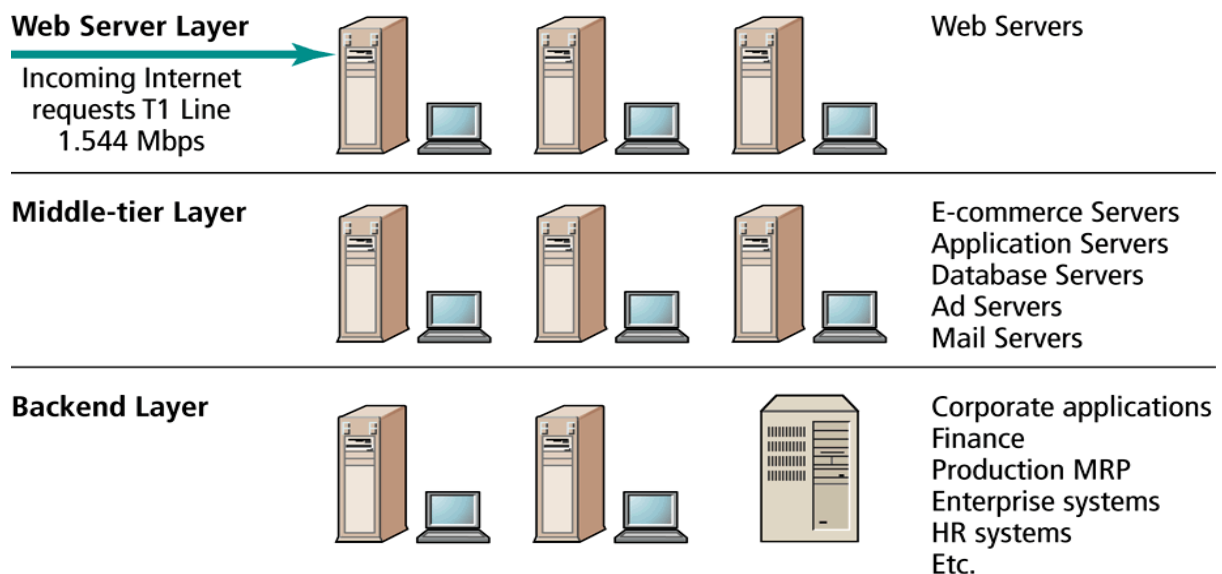
- System architecture: refers to the arrangement of software, machinery, and tasks in an information system needed to achieve a specific functionality

- Two-tier architecture: Web server responds to requests for Web pages and a database server provides backend data storage
- Multi-tier architecture: Web server is linked to a middle-tier layer that typically includes a series of application servers that perform specific tasks, as well as to a backend layer of existing corporate systems



(a) Two-tier Architecture

Figure 4.11-- Two-Tier E-commerce Architecture



(b) Multi-tier Architecture

Figure 4.12-- Multi-tier E-commerce Architecture

4.4 Web Server Software

- All e-commerce sites require basic Web server software to answer HTTP requests from customers
- Apache the leading Web server software; works only with UNIX operating systems
- Microsoft's Internet Information Server (IIS) the second major Web server software

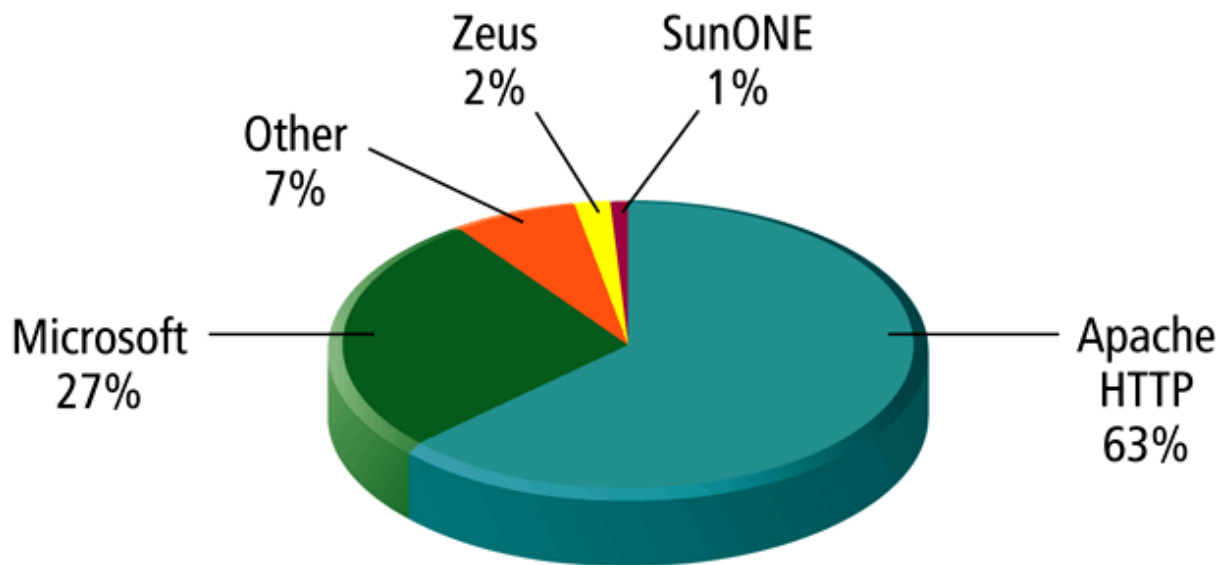


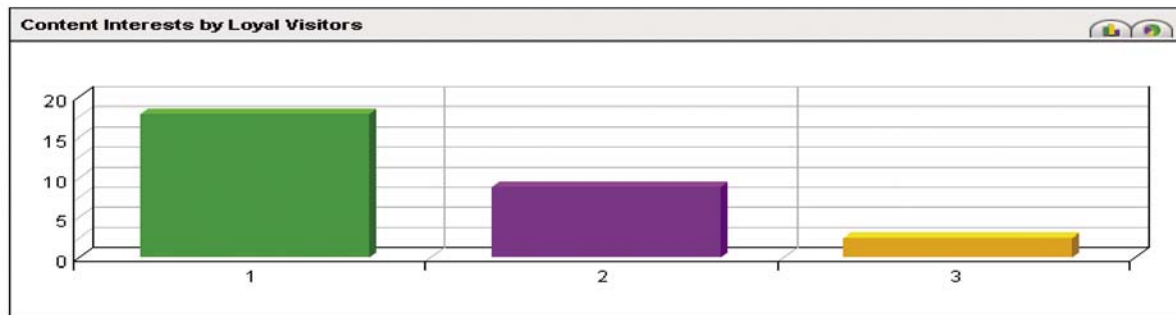
Figure 4.13-- Key Players in Web Server Software

FUNCTIONALITY	DESCRIPTION
Processing of HTTP requests	Receive and respond to client requests for HTML pages
Security services (Secure Sockets Layer)	Verify username and password; process certificates and private/public key information required for credit card processing and other secure information
File Transfer Protocol	Permits transfer of very large files from server to server
Search engine	Indexing of site content; keyword search capability
Data capture	Log file of all visits, time, duration, and referral source
E-mail	Ability to send, receive, and store e-mail messages
Site management tools	Calculate and display key site statistics, such as unique visitors, page requests, and origin of requests; check links on pages

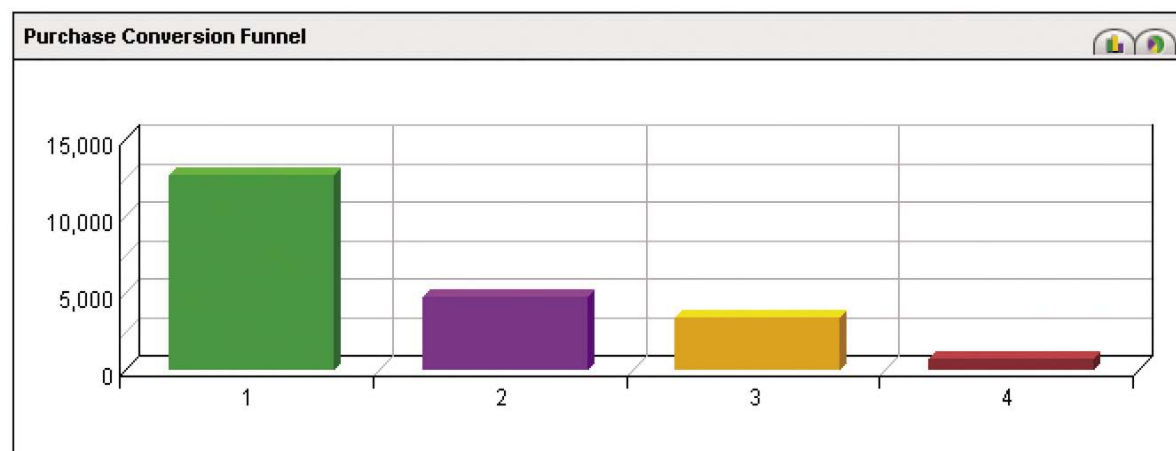
Table 4.3-- Basic Functionality Provided by Web Servers

4.5 Site Management Tools

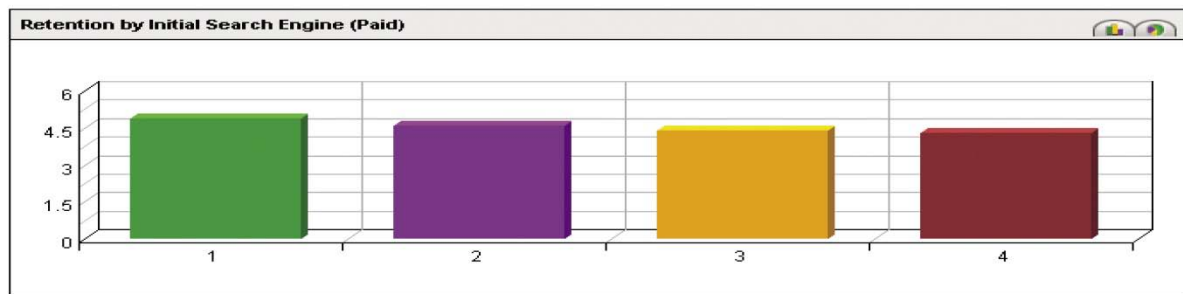
- All Web servers contain basic site management tools that verify that links on pages are still valid and also identify orphan files
- Additional site management software and services such as those provided by Web trends can be purchased



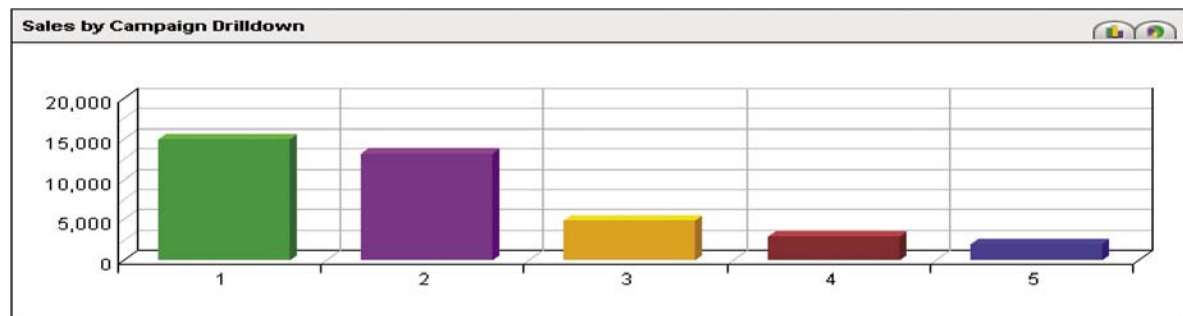
Content Interests by Loyal Visitors				
Frequency	Content Interests	Avg. Frequency	Avg. Visit Page Views	Visits
1. Moderately Loyal (16-25 Visits)	support	18.3	9	33
	contact	18.0	10	12
	checkout	18.0	10	11
	products	17.9	8	81
	search	17.9	8	25
2. Somewhat Loyal (6-15 Visits)	business phone systems	13.0	12	2
	default	9.1	15	27
	partners	9.0	9	168
	contact	8.9	10	188
	support	8.8	9	517
3. Dormant (1-5 Visits)	default	2.6	14	200
	calling plans	2.5	9	167
	wireless phones	2.5	9	93
	residential services	2.5	9	27
	register	2.5	10	4,671



Purchase Conversion Funnel				
Scenario Analysis Step	Visits	Step Conversion Rate	% of All Visits	Scenario Conversion Rate
1. Cart View	12,634	-	19.87%	-
2. Cart Add	4,805	38.03%	7.56%	38.03%
3. Started Checkout	3,374	70.22%	5.31%	26.71%
4. Cart Complete	673	19.95%	1.06%	5.33%
Total	N/A	N/A	N/A	5.33%



Retention by Initial Search Engine (Paid)					
Initial Search Engine	Initial Search Engine Phrase	Avg. Recency	Avg. Frequency	Avg. Latency	Avg. Lifetime Value
1. ask jeeves	wireless phones	5.3	4.1	4.5	\$61.72
	dsl service	4.0	2.0	3.7	\$0.00
2. overture	dsl service	5.9	2.0	5.9	\$0.00
	dsl internet	5.6	3.8	5.1	\$24.11
	wireless phone service	4.9	3.3	4.2	\$37.75
	wireless phone plan	4.7	1.9	4.2	\$7.61
	wireless phones	4.0	4.4	3.7	\$29.84
3. looksmart	dsl internet	4.7	3.4	4.1	\$64.81
	wireless phone service	4.1	3.9	3.0	\$57.01
4. google	dsl service	4.6	2.8	4.5	\$30.00
	dsl internet	4.6	3.3	3.8	\$49.47
	wireless phone service	4.4	3.7	3.7	\$69.31
	wireless phones	4.3	3.5	3.7	\$45.94
	wireless phone plan	3.7	3.7	3.5	\$39.69



Sales by Campaign Drilldown			
Campaign	Revenue	Avg. Order Value	Order Count
1. Banner	\$14,997.00	\$214.24	70
2. Search Engine	\$13,223.00	\$231.98	57
Yahoo	\$8,855.00	\$253.00	35
phone accessories	\$2,802.00	\$400.29	7
mobile	\$2,436.00	\$270.67	9
minutes offer	\$1,524.00	\$381.00	4
wireless	\$1,454.00	\$145.40	10
cell phone	\$639.00	\$127.80	5
Lycos	\$2,056.00	\$205.60	10
Google	\$1,516.00	\$168.44	9
Microsoft Network	\$796.00	\$265.33	3
3. Print	\$4,814.00	\$192.56	25
4. Television	\$2,878.00	\$359.75	8
5. Email	\$1,879.00	\$156.58	12
Total	\$37,791.00	N/A	172

Figure 4.14-- WebTrends Software

4.6 Dynamic Page Generation Tools

- Dynamic page generation: contents of Web page are stored as objects in a database rather than being hard-coded in HTML, and are fetched when needed from database
- Tools include CGI (Common Gateway Interface), ASP (Active Server Pages), JSP (Java Server Pages), etc.
- Lowers menu costs, permits easy online market segmentation, and enables cost-free price discrimination

4.7 Application Servers

- Web application servers: software programs that provide specific business functionality required of a Web site
- These are an example of middleware software
- A number of different types available, providing a variety of functionality

APPLICATION SERVER	FUNCTIONALITY
Catalog display	Provides a database for product descriptions and prices
Transaction processing (shopping cart)	Accepts orders and clears payments
List server	Creates and serves mailing lists and manages e-mail marketing campaigns
Proxy server	Monitors and controls access to main Web server; implements firewall protection
Mail server	Manages Internet e-mail
Audio/video server	Stores and delivers streaming media content
Chat server	Creates an environment for online real-time text and audio interactions with customers
News server	Provides connectivity and displays Internet news feeds
Fax server	Provides fax reception and sending using a Web server
Groupware server	Creates workgroup environments for online collaboration
Database server	Stores customer, product, and price information
Ad server	Maintains Web-enabled database of advertising banners that permits customized and personalized display of advertisements based on consumer behavior and characteristics
Auction server	Provides a transaction environment for conducting online auctions
B2B Server	Implements buy, sell, and link marketplaces for commercial transactions

Table 4.4-- Application Servers and Their Functions

4.8 E-commerce Merchant Server Software Functionality

- Provides the basic functionality needed for online sales, including:
- Online catalog
- Shopping cart
- Credit card processing

Merchant Server Software Packages (E-commerce Suites)

- Offer integrated environment that provides functionality and capabilities needed to develop sophisticated, customer-centric site
- Key factors to consider in choosing include:
 - Functionality
 - Support for different business models
 - Business process modeling tools
 - Visual site management tools and reporting
 - Performance and scalability
 - Connectivity to existing business systems
 - Compliance with standards
 - Global and multicultural capability
 - Local sales tax and shipping rules

PRODUCT	APPROXIMATE PRICE
Microsoft Commerce Server 2002 Enterprise Edition	\$6,999 for Standard edition, \$19,999 per processor for Enterprise Edition
IBM WebSphere Commerce Professional Entry Edition	\$20,000 per processor
IBM WebSphere Commerce Professional Edition	\$80,000 per processor
Broadvision One-to-One Commerce	\$60,000 per processor
InterWorld Commerce Exchange 6.0	\$65,000
InterShop United Commerce Management/EnfinityB2C Solution	\$125,000–\$250,000
Blue Martini Commerce	\$1,000,000+

Table 4.5-- Widely Used Midrange and High-end E-commerce Suites

****Cost varies with time.**

4.9 Choosing the Hardware for an E-commerce Site

- Hardware platform: refers to all the underlying computing equipment that the system uses to achieve e-commerce functionality
- Objective to have enough platform capacity to meet peak demand but not so much that you are wasting money
- Important to understand the different factors that affect speed, capacity and scalability of a site

Right-Sizing Your Hardware Platform: The Demand Side

- Demand that customers put on a site- the most important factor affecting the speed of a site
- Factors involved in demand include:
 - Number of simultaneous users in peak periods
 - Nature of customer requests (user profile)
 - Type of content (dynamic versus static Web pages)
 - Required security
 - Number of items in inventory
 - Number of page requests
 - Speed of legacy applications

VISITOR ACTIVITY	PERCENTAGE OF VISITORS
Browse	76%
Search for content	51%
Shop and purchase goods	44%

Table 4.6-- Visitor Profile at Typical E-commerce Sites(UCLA internet report)

SITE TYPE	PUBLISH/ SUBSCRIBE	SHOPPING	CUSTOMER SELF-SERVICE	TRADING	WEB SERVICES/B2B
Examples	WSJ.com	Amazon.com	NetBank.com Travelocity.com	E-Trade.com	Ariba e-procurement exchanges
Content	Dynamic Multiple authors High volume Not user specific	Catalog Dynamic items User profiles with data mining	Data in legacy applications Multiple data sources	Time sensitive High volatility Multiple suppliers and consumers Complex transactions	Data in legacy applications Multiple data sources Complex transactions
Security	Low	Privacy Non-repudiation Integrity Authentication Regulations	Privacy Non-repudiation Integrity Authentication Regulations	Privacy Non-repudiation Integrity Authentication Regulations	Privacy Non-repudiation Integrity Authentication Regulations
Percent Secure Pages	Low	Medium	Medium	High	Medium
Cross Session Information	No	High	High	High	High
Searches	Dynamic Low volume	Dynamic High volume	Not dynamic Low volume	Low volume	Moderate volume
Unique items (SKUs)	High	Medium to high	Medium	High	Medium to high
Transaction Volume	Moderate	Moderate to high	Moderate	High to extremely high	Moderate
Legacy Integration Complexity	Low	Medium	High	High	High
Page views (hits)	High to very high	Moderate to high	Moderate to low	Moderate to high	Moderate

Table 4.7-- Factors in Right-sizing an E-commerce Platform

Right-Sizing Your Hardware Platform: The Supply Side

- Scalability: refers to the ability of a site to increase in size as demand warrants
- Ways to scale hardware:
 - Vertically: increase the processing power of individual components
 - Horizontally: employ multiple computers to share the workload
 - Improve processing architecture

TECHNIQUE	APPLICATION
Use a faster computer	Applies to edge servers, presentation servers, data servers, etc.
Create a cluster of computers	Use computers in parallel to balance loads
Use appliance servers	Special-purpose computers optimized for their task
Segment workload	Segment incoming work to specialized computers
Batch requests	Combine related requests for data into groups, process as a group
Manage connections	Reduce connections between processes and computers to a minimum
Aggregate user data	Aggregate user data from legacy applications in single data pools
Cache	Store frequently used data in cache rather than on the disk

Table 4.8-- Eight Vertical and Horizontal Scaling Techniques

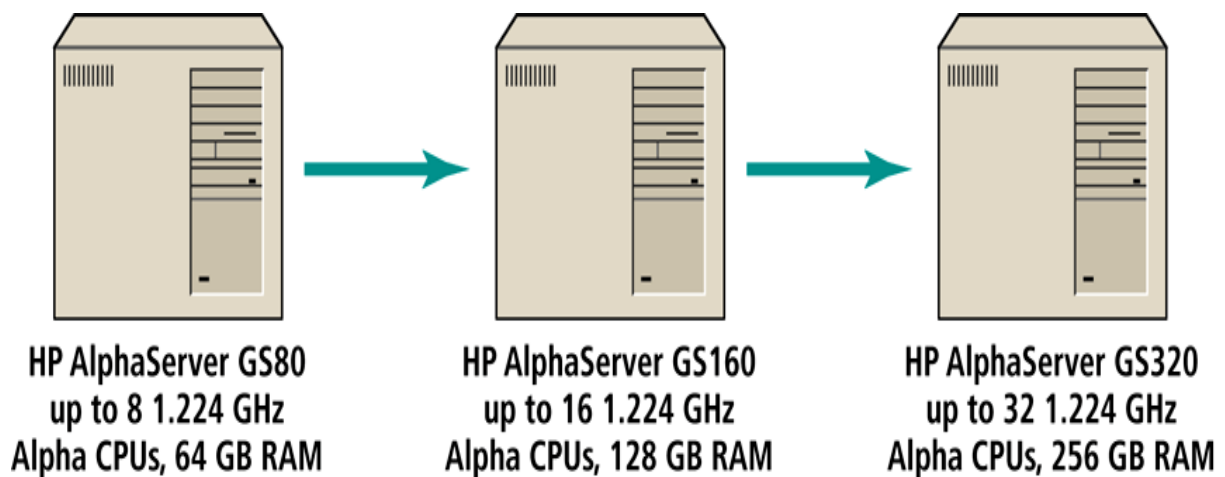


Figure 4.15-- Vertically Scaling a System

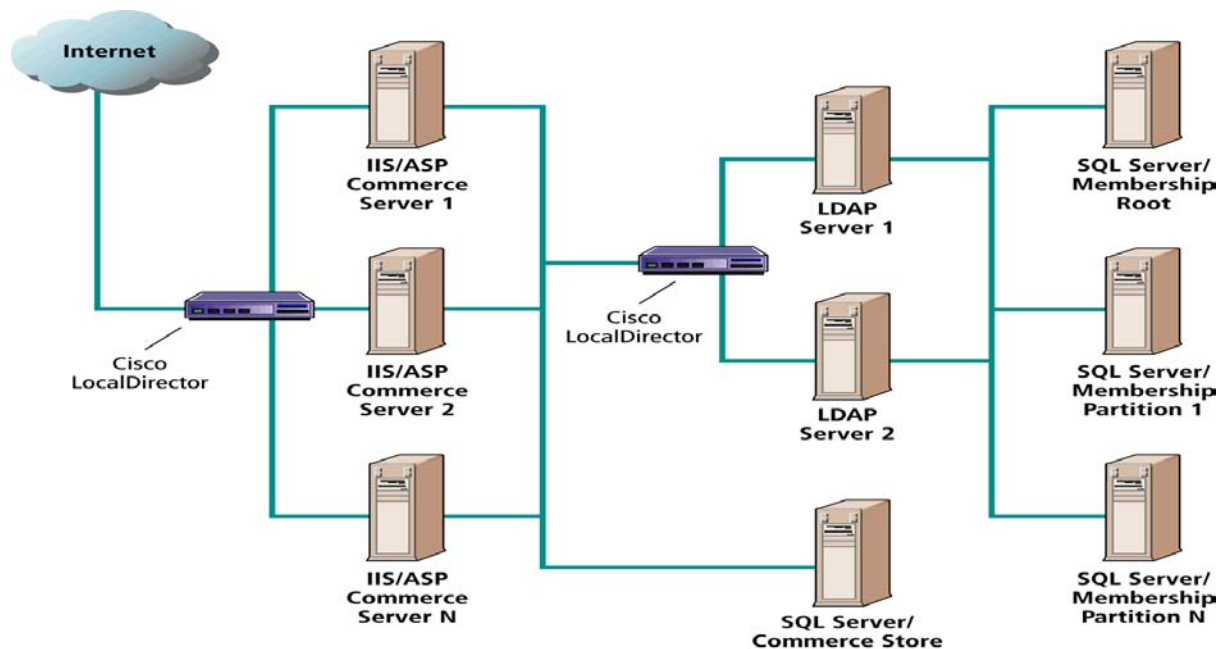


Figure 4.16-- Horizontally Scaling a System

ARCHITECTURE IMPROVEMENT	DESCRIPTION
Separate static content from dynamic content.	Use specialized servers for each type of workload.
Cache static content.	Increase RAM to the gigabyte range and store static content in RAM.
Cache database lookup tables.	Cache tables used to look up database records.
Consolidate business logic on dedicated servers.	Put shopping cart, credit card processing, and other CPU-intensive activity on dedicated servers.
Optimize ASP code.	Examine your code to ensure it is operating efficiently.
Optimize the database schema.	Examine your database search times and take steps to reduce access times.

Table 4.9-- Improving the Processing Architecture of Your Site

4.10 Web Site Design: Basic Business Considerations

- To achieve basic business functionality of a Web site, we need to be aware of design guidelines and software tools that can build active content and functionality
- Poorly designed Web sites drive customers away

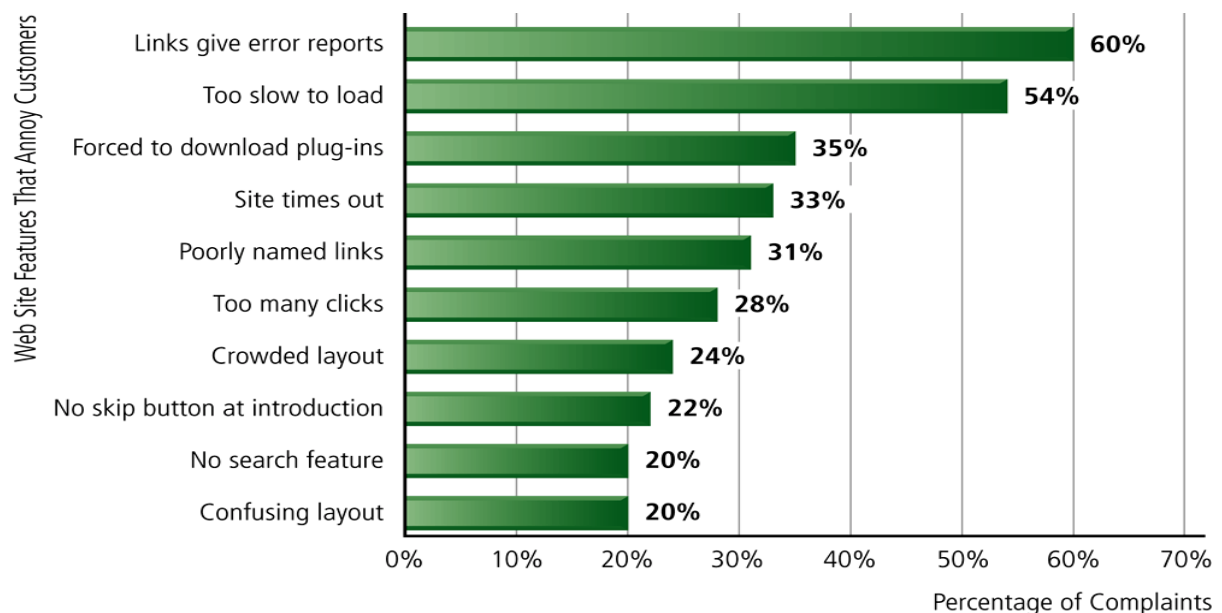


Figure 4.17-- Web Site Features that Annoy Customers

FACTOR	DESCRIPTION
Functionality	Pages that work, load quickly, and point the customer toward your product offerings
Informational	Links that customers can easily find to discover more about you and your products
Ease of use	Simple fool-proof navigation
Redundant navigation	Alternative navigation to the same content
Ease of purchase	One or two clicks to purchase
Multi-browser functionality	Site works with the most popular browsers
Simple graphics	Avoids distracting, obnoxious graphics and sounds that the user cannot control
Legible text	Avoids backgrounds that distort text or make it illegible

Table 4.10-- The Eight Most Important Factors in Successful E-commerce Site Design

4.11 Tools for Interactivity and Active Content

- CGI (Common Gateway Interface): Set of standards for communication between a browser and a program running on a server that allows for interaction between the user and the server
- ASP (Active Server Pages): Enables programmers using Microsoft's IIS package to build dynamic pages
- Java: Allows programmers to create interactivity and active content on the client computer
- JSP (Java Server Pages): Similar to CGI and ASP; allows developers to use a combination of HTML, JSP scripts and Java to dynamically generate Web pages in response to user requests
- JavaScript: Programming language invented by Netscape that is used to control objects on a Web page and handle interactions with browser
- ActiveX: Programming language invented by Microsoft to compete with Java
- VBScript: Programming language invented by Microsoft to compete with JavaScript
- ColdFusion: An integrated server-side environment for developing interactive Web applications

Personalization Tools

- Personalization: Ability to treat people based on their personal qualities and prior history with your site

- Customization: Ability to change the product to better fit the needs of the customer
- Cookies- the primary method for achieving personalization and customization

The Information Policy Set

- Privacy policy: Set of public statements declaring how site will treat customers' personal information that is gathered by site
- Accessibility rules: Set of design objectives that ensure disabled users can affectively access site

Chapter V

Security In E-commerce

Learning Objectives:

- Understand the scope of e-commerce crime and security problems
- Describe the key issues of e-commerce security
- Understand the tension between security and other values
- Identify the key security threats in the e-commerce environment
- Describe how various forms of encryption technology help protect the security of messages sent over the Internet
- Describe implementation and firewall management issues

The Internet is a huge place that hosts several millions of people. As all the people are not honest, illegal activity' is inevitable. There are two basic types of criminal activities:

The person who tries to understand and learn the various systems and capabilities of any private network. In this case the person has no intentions to do any damage or to steal any resources but tries to observe the system functionality. For example teenagers who tries to enter into a network out of curiosity till they are caught or deducted.

The persons who uses the Internet and the Web to benefit themselves by doing illegal activities such as, stealing software's, information and causing damage to resources. This type of criminal activity raises the concern for network security.

A large system like Internet has many holes and crevices in which a determined person can easily find the way to get into any private network. There are many terms used to signify the computer criminals.

5.1 Type of Computer Criminals

Hacker-is a person who has good knowledge about computers and tries to open the data packets and steal the information transmitted through the Internet.

Cracker-is someone who specifically breaks into computer systems by bypassing or by guessing login passwords. These persons enter into the network as authenticated users and can cause any harm to the system.

Phreaks-are persons who hack phone systems. These people specifically try to scam long distance phone-time for them to control phone switch capability or to hack company automated EBX systems to get free voice-mail accounts or to raid companies existing voice-mail messages.

Phracker-is the combination of freak and cracker. A phracker breaks into phone systems and computer systems and specializes in total network destruction.

5.2 Security Issues

Another major issue in the Internet security is misrepresentation and fraud. One of the reasons of misrepresentation is that on the net it is easy to appear as anyone or anything without the actual presence.

For example, shops site displaying goods, which the dealer may not have them physically. But at the same time, creating a scam site is not as easy as it seems to be, because one must host pages somewhere, which makes the provider responsible for the content. For this reason, most Web site providers examine

sites and have access to the information that has been provided. With the rapid growth in use of Internet, in future the number of fraud cases in which perpetrators create their own provider. This is possible specially, in case of offshore servers where laws are more favorable to the criminal and enforcement will be very difficult. For this reason, it is increasingly important for Web users to protect themselves.

In case of doing commercial transactions everybody seems to fear having their credit card information stolen when they type it into the Web sites, this has developed the use of Secure servers. Here the protection is only between the two points of transmission. But the information is not protected at the browser or at the server. In reality there are three places where data can be intercepted

- In the browser
- Between the browser and the server
- In the server

In the browser, the users often type sensitive data into a form field and continue their Web session. If the user leaves the computer tuned on and unattended, anyone can access that computer and view the last user's personal data.

When the crucial information (credit card) is sent to a server even by using a secure method it is often encrypted and stored or sent as e-mail. During this process it could be intercepted. For example, a hacker can access to the e-mail system and the crucial data sent by the e-mail.

There is currently huge cry for secure commerce server that will make credit card transactions fairly safe. Although such servers might protect consumers from having their credit card information stolen, they do nothing to protect the store owner from criminals who use fraudulent credit card numbers or false identities to purchase the products. Unfortunately storeowners have less protection from these kinds of frauds.

One of the simplest ways to safeguard against illegal transactions is to have your order entry system check the credit numbers against the credit card check sum standard. One can run this algorithm on any credit card number to determine whether it belongs to valid sequence of numbers.

Secure servers attempt to encrypt the data between the browser and the server. Pirates have many ways in which they can intercept the data. However, this requires that the pirates operate within a trusted look and have significant technical expertise.

Sometimes when the data reaches the secure server, the system decrypts the data. Even if the data is decrypted for a specific time period, the information would still be intercepted. Most sophisticated software handles decryption using the quickest and most uncrackable methods.

There are six key issues to e-commerce security.

- **Integrity:** ability to ensure that information being displayed on a Web site or transmitted/received over the Internet has not been altered in any way by an unauthorized party
- **Nonrepudiation:** ability to ensure that e-commerce participants do not deny (repudiate) online actions.
- **Authenticity:** ability to identify the identity of a person or entity with whom you are dealing on the Internet.
- **Confidentiality:** ability to ensure that messages and data are available only to those authorized to view them.
- **Privacy:** ability to control use of information a customer provides about himself or herself to merchant.
- **Availability:** ability to ensure that an e-commerce site continues to function as intended.

DIMENSIONS	CUSTOMER'S PERSPECTIVE	MERCHANT'S PERSPECTIVE
Integrity	Has information I transmit or receive been altered?	Has data on the site been altered without authorization? Is data being received from customers valid?
Nonrepudiation	Can a party to an action with me later deny taking the action?	Can a customer deny ordering products?
Authenticity	Who am I dealing with? How can I be assured that the person or entity is who they claim to be?	What is the real identity of the customer?
Confidentiality	Can someone other than the intended recipient read my messages?	Are messages or confidential data accessible to anyone other than those authorized to view them?
Privacy	Can I control the use of information about myself transmitted to an e-commerce merchant?	What use, if any, can be made of personal data collected as part of an e-commerce transaction? Is the personal information of customers being used in an unauthorized manner?
Availability	Can I get access to the site?	Is the site operational?

Table 5.1-- Customer and Merchant Perspectives on the Different issues of E-commerce Security

The Tension between Security and Other Values:

- Security vs. ease of use: the more security measures that are added, the more difficult a site is to use, and the slower it becomes.
- Security vs. desire of individuals to act anonymously.

5.3 Security Threats in the E-commerce Environment

■ Three key points of vulnerability:

- Client
- Server
- Communications channel

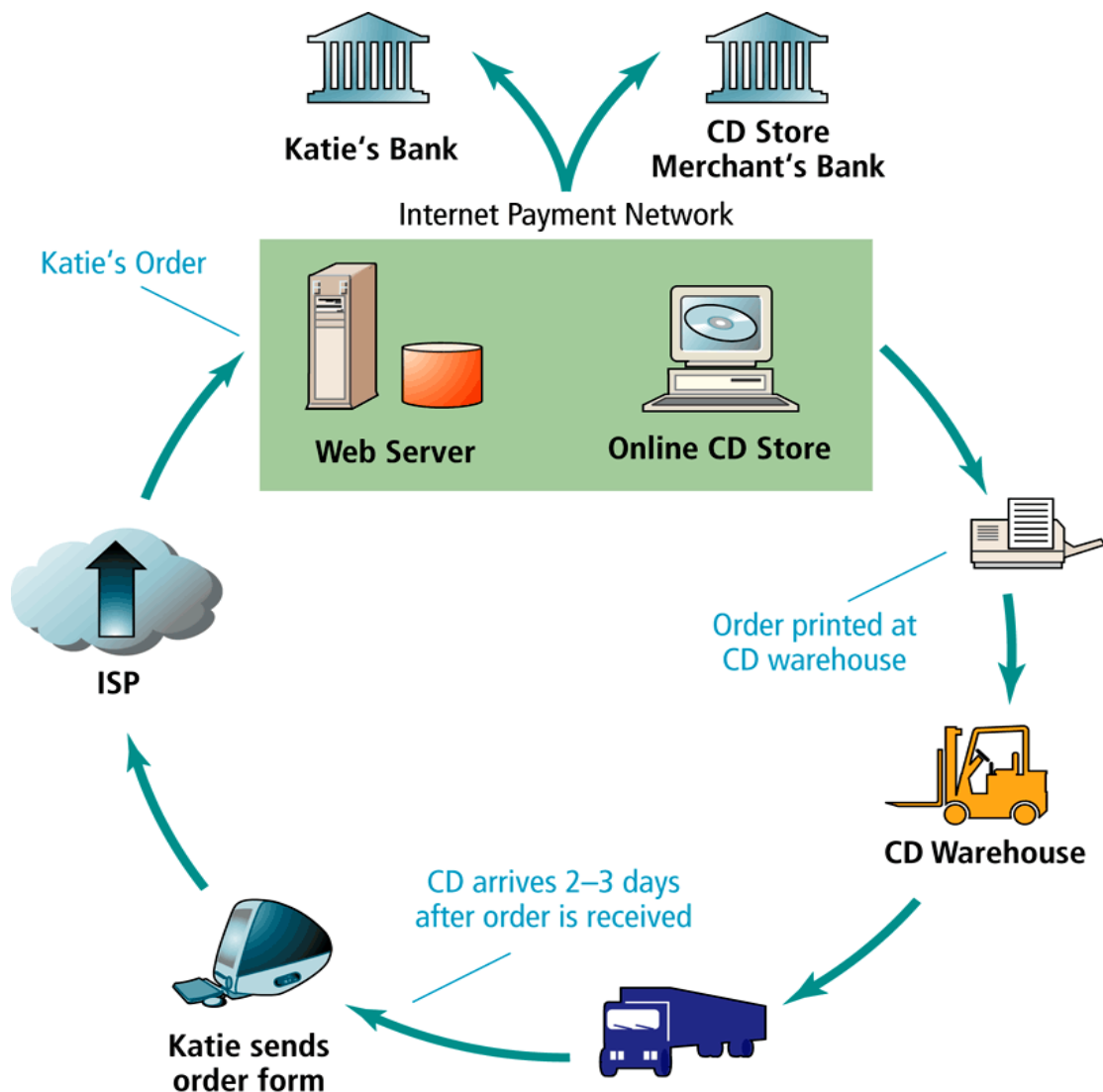


Figure 5.1--A Typical E-commerce Transaction

■ Most common threats:

- Malicious code
- Hacking and cyber vandalism

- Credit card fraud/theft
- Spoofing
- Denial of service attacks
- Sniffing
- Insider jobs

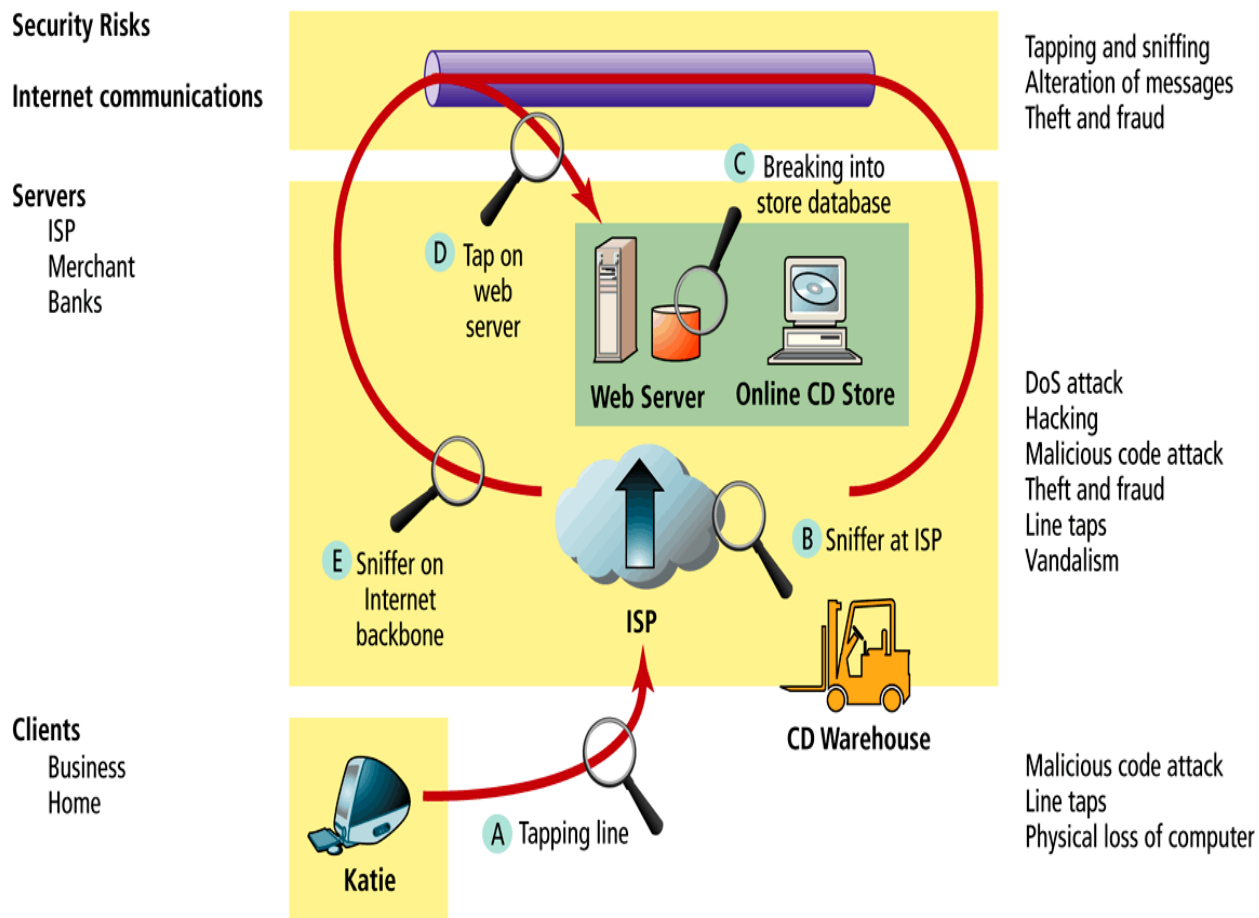


Figure 5.2---Vulnerable Points in an E-commerce Environment

Malicious code:- malicious code(sometimes referred to as “malware”) includes a variety of threats such as viruses, worms, Trojan horses, and bad applets.

- **Viruses:** computer program that has the ability to replicate or make copies of itself, and spread to other files. In addition to the ability to replicate, most computer viruses deliver a “payload”. The payload may be destructive or benign. Viruses include macro viruses, file-infecting viruses and script viruses.

Macro viruses:- macro viruses are application specific, meaning that the virus affects only the application for which it was written, such as Microsoft word, excel or PowerPoint.

File-infecting viruses:- File-infecting viruses usually effect executable files, such as *.com, *.exe, *.drv, and *.dll files.

Script viruses:- Script viruses are written in script programming languages such as VBScript and JavaScript. The viruses are activated simply by double clicking an infected *.vbs or *.js file.

NAME	TYPE	DESCRIPTION
Melissa	Macro virus/worm	First spotted in March 1999. At the time, Melissa was the fastest spreading infectious program ever discovered. It attacked Microsoft Word's normal.dot global template, ensuring infection of all newly created documents. It also mailed an infected Word file to the first 50 entries in each user's Microsoft Outlook address book.
CodeRed	worm	Appeared in 2001. It spread to hundreds of thousands of systems and tried to flood the White House IP address with bogus information requests.
Chernobyl	File infecting virus	First appeared in 1998. It is very destructive: It wipes out the first megabyte of data on a hard disk (making the rest useless) every April 26, the anniversary of the nuclear disaster at Chernobyl.
Klez	E-mail worm	Most prolific virus of 2002. Klez comes in an e-mail with a random subject line and message body. Once launched, the worm sends itself to all addresses in the Windows address book, the database of instant-messaging program ICQ, and local files. A file from the user's system is randomly selected and sent along with the worm. Klez also attempts to disable anti-virus software and drops another virus in the user's system that tries to infect executable files there and across network filing systems.
Bugbear	Trojan horse/worm	Struck in 2002. It appeared as an e-mail attachment and random e-mail was infected in over 22,000 systems in 24 hours. It can intercept Web activity (i.e., credit card information) and can disable Windows and anti-virus software.

Table 5.2-----Examples of Malicious Code

- Worms: designed to spread from computer to computer.
- Trojan horse: appears to be benign, but then does something other than expected.
- Bad applets (malicious mobile code): malicious Java applets or ActiveX controls that may be downloaded onto client and activated merely by surfing to a Web site.

Hacking and Cyber Vandalism:-

- *Cyber vandalism*: Intentionally disrupting, defacing or destroying a Web site.
- Types of *hackers* include:
 - White hats – Members of “tiger teams” used by corporate security departments to test their own security measures.
 - Black hats – Act with the intention of causing harm.
 - Grey hats – Believe that they are pursuing some greater good by breaking in and revealing system flaws.

Credit Card Fraud:-

- Hackers target credit card files and other customer information files on merchant servers. They use to steal data to establish credit under false identity.
- One solution: New identity verification mechanisms.

Spoofing:- Misrepresenting oneself by using fake e-mail addresses or masquerading as someone else

Denial of service (DoS) attack: - Hackers flood Web site with useless traffic to inundate and overwhelm network.

Distributed denial of service (dDoS) attack: - Hackers use numerous computers to attack target network from numerous launch points.

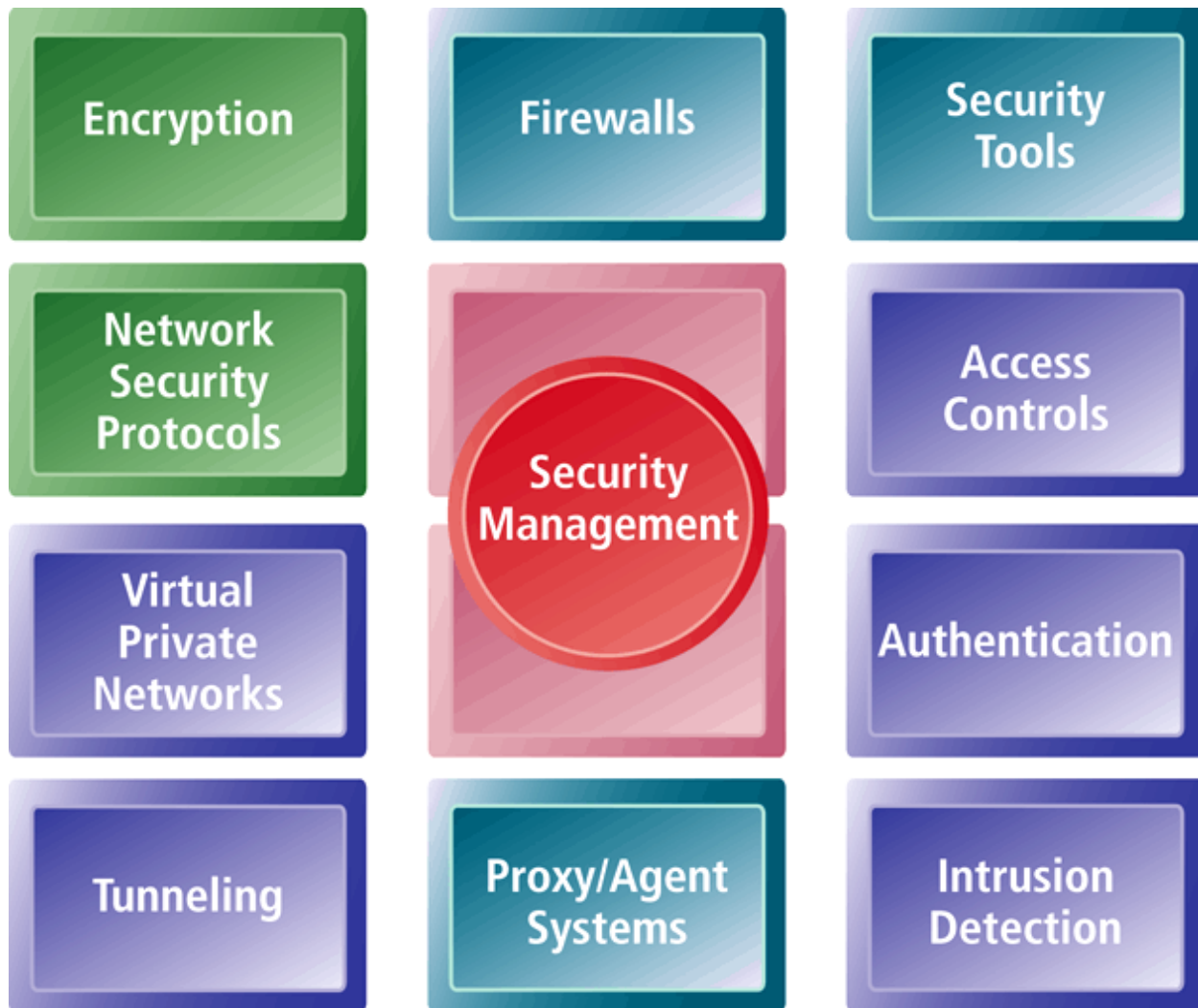
Sniffing:- It is a type of eavesdropping program that monitors information traveling over a network. It enables hackers to steal proprietary information from anywhere on a network.

Insider jobs:- It is a single largest financial threat. The largest financial threats to business firms come not from robberies but from embezzlement by insiders. The same is true for E-commerce firms.

Technology Solutions for Security threats:-

- Protecting Internet communications (encryption).
- Securing channels of communication (SSL, S-HTTP, VPNs).
- Protecting networks (firewalls).
- Protecting servers and clients.

Tools Available to Achieve Site Security:-



5.4 Protecting Internet Communications: Encryption

- **Encryption:** The process of transforming plain text or data into cipher text that cannot be read by anyone other than the sender and receiver.

This transformation of plain text to cipher text is accomplished by using a key or cipher. A key is any method for transforming plain text to cipher text. Ancient Egyptian and Phoenician commercial records were encrypted using substitution and transposition ciphers.

■ Purpose:

- Secure stored information
- Secure information transmission

■ Encryption Provides:

- Message integrity
- Nonrepudiation
- Authentication
- Confidentiality

5.4.1 Symmetric Key Encryption

It is also known as secret key encryption. Both the sender and receiver use the same digital key to encrypt and decrypt message. It requires a different set of keys for each transaction. It was used extensively throughout the world war II and is still a part of internet encryption.

Drawbacks of Symmetric key encryption:-

- ✚ In this digital age, computers are so powerful and fast that these ancient means of encryption can be broken quickly.
- ✚ Symmetric key encryption requires that both parties share the same key. In order to share the same key, they must send the key over a presumably insecure medium where it could be stolen and used to decipher messages.
- ✚ In a population of millions of users, thousands of millions of keys would be needed to accommodate all e-commerce customers. Clearly this situation would be too unwieldly to work in practice.

The most widely used symmetric key encryption on the internet today is the **DATA ENCRYPTION STANDARD (DES)** developed by the National Security Agency (NSA). It uses 56-bit encryption key. Other types use upto 2048 bit keys.

5.4.2 Public Key Encryption

- Public key cryptography solves symmetric key encryption problem of having to exchange

secret key.

- It uses two mathematically related digital keys – public key (widely disseminated) and private key (kept secret by owner).
- Both keys are used to encrypt and decrypt message.
- Once key is used to encrypt message, same key cannot be used to decrypt message.
- For example, sender uses recipient's public key to encrypt message; recipient uses his/her private key to decrypt it.

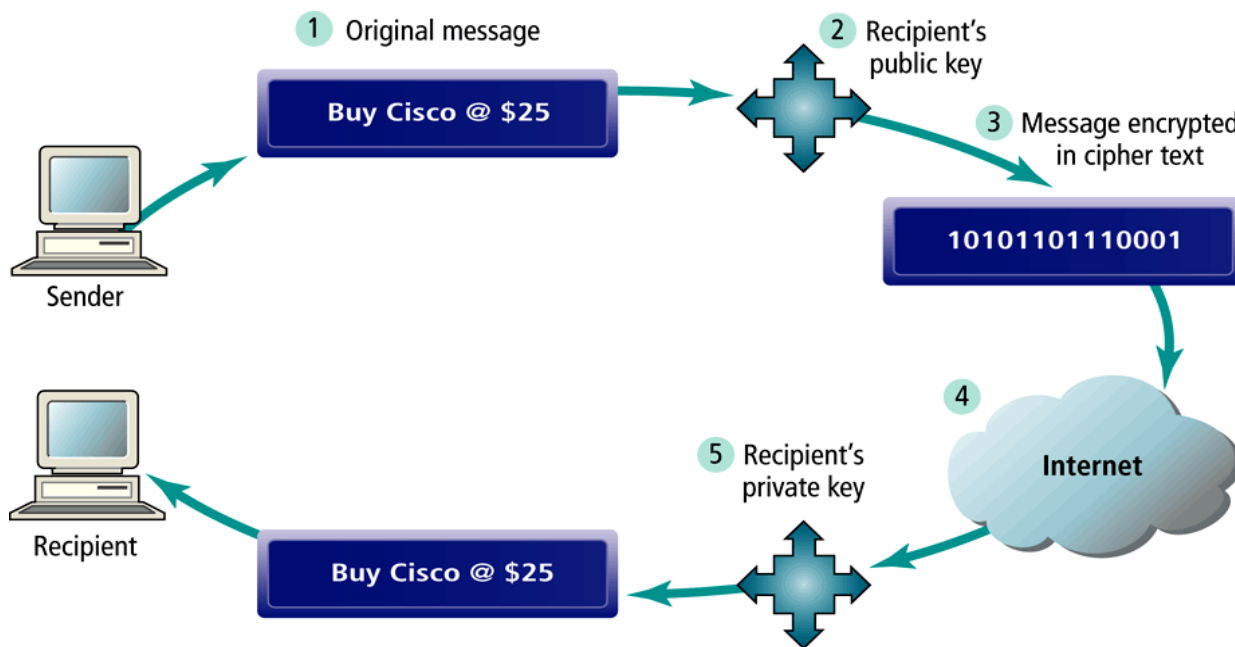


Figure 5.3---Public Key Cryptography – A Simple Case

Drawbacks of Public Key Encryption:-

- ✚ Authentication
- ✚ Nonrepudiation and
- ✚ Integrity are not achieved by this encryption technique.

5.4.3 Public Key Encryption using Digital Signatures and Hash Digests

- Application of hash function (mathematical algorithm) by sender prior to encryption produces hash digest that recipient can use to verify integrity of data.

- Double encryption with sender's private key (digital signature) helps ensure authenticity and nonrepudiation.

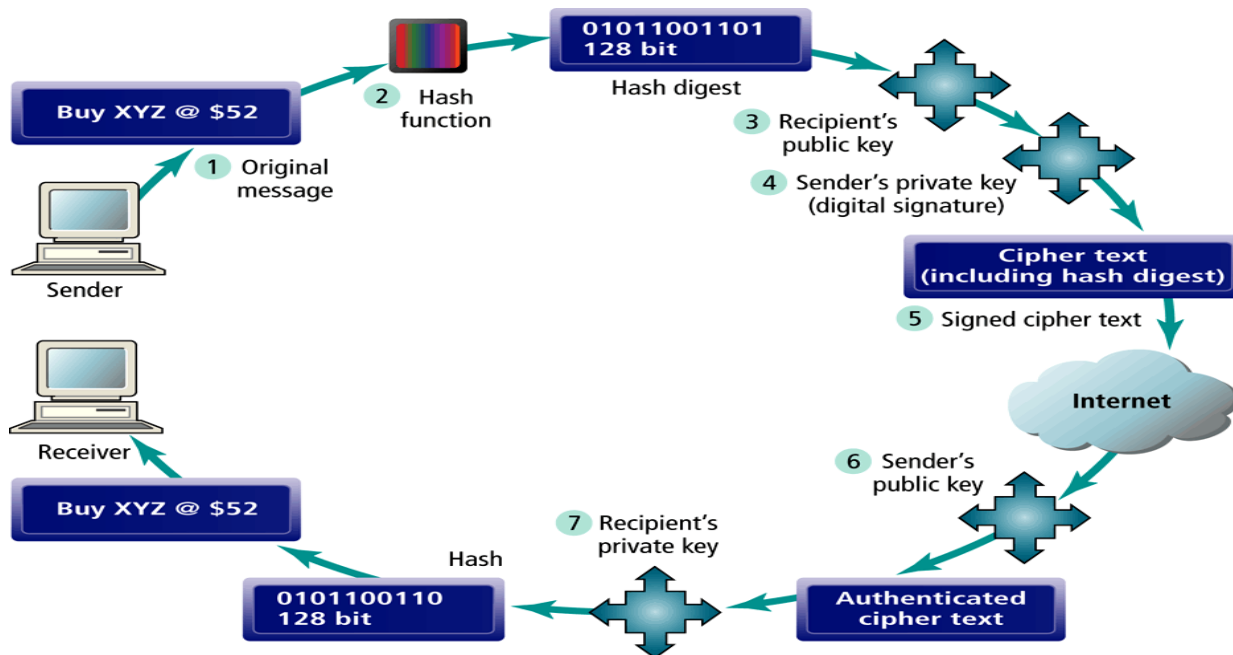


Figure 5.4--Public Key Cryptography with Digital Signatures

Drawbacks of Public Key Cryptography with Digital Signatures:-

- ✚ Computationally slow
- ✚ It decreases transmission speed
- ✚ It increases processing time.

5.4.4 Digital Envelopes

- It addresses weaknesses of public key encryption (computationally slow, decreases transmission speed, increases processing time) and symmetric key encryption (faster, but not more secure).
- It uses symmetric key encryption to encrypt document but public key encryption to encrypt and send symmetric key.

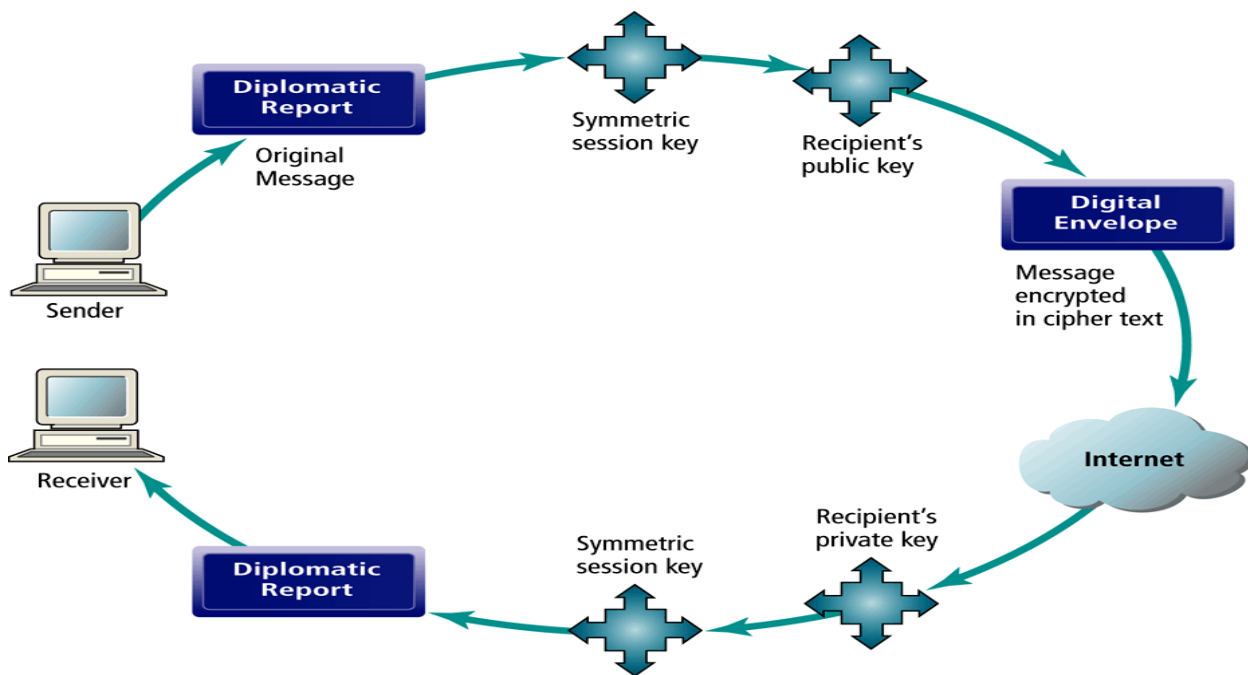


Figure 5.5-Public Key Cryptography: Creating a Digital Envelope

Drawbacks of Public Key Cryptography: Creating a Digital Envelope:-

How do we know that people and institutions are who they claim to be? Anyone can make up a private and public key combination and claim to be the Hawassa University or President of USA.

5.4.5 Digital Certificates and Public Key Infrastructure (PKI)

It is an attempt to solve the problem of digital identity.

■ **Digital certificate** is a digital document that includes:

- Name of subject or company
- Subject's public key
- Digital certificate serial number
- Expiration date
- Issuance date
- Digital signature of certification authority (trusted third party (institution) that issues certificate)
- Other identifying information

■ **CAs (Certification Authorities):-** these are trusted third parties that issue digital certificates.

- **Public Key Infrastructure (PKI):** refers to the CAs and digital certificate procedures that are accepted by all parties.

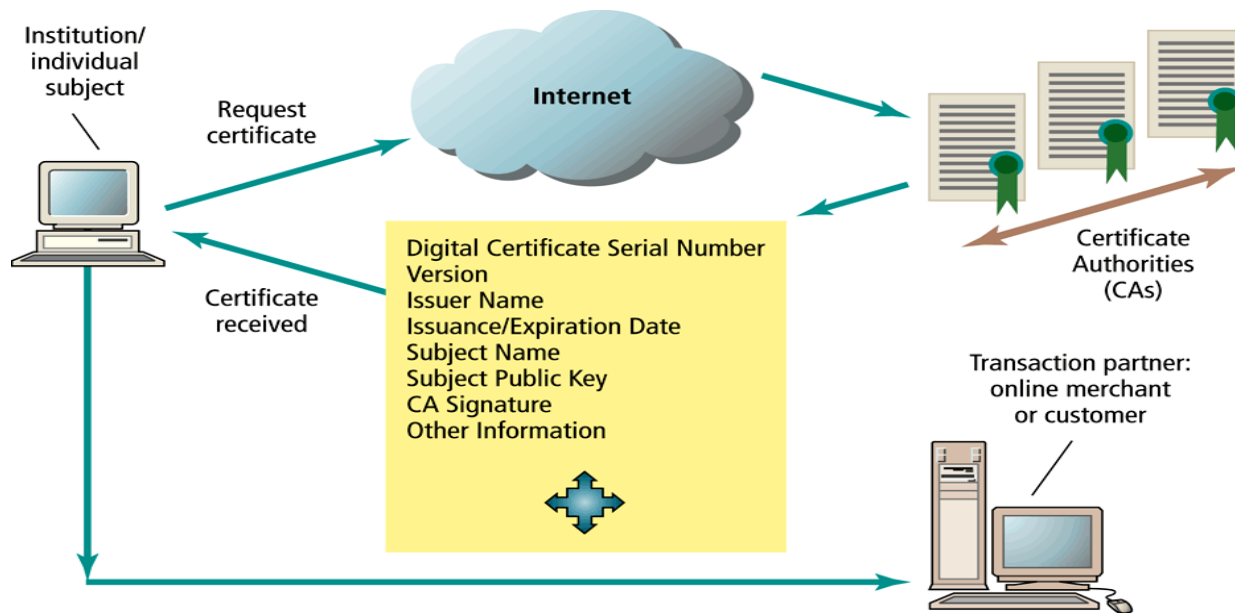


Figure 5.6-- Digital Certificates and Certification Authorities

Limits to Encryption Solutions:

- PKI applies mainly to protecting messages in transit.
- PKI is not effective against insiders.
- Protection of private keys by individuals may be haphazard.
- No guarantee that verifying computer of merchant is secure.
- CAs are unregulated, self-selecting organizations.

5.5 IMPLEMENTATION AND MANAGEMENT ISSUES

This section explores important issues that should be considered when de-signing, implementing, and integrating encryption to engage in electronic commerce.

Hardware versus Software Implementations

Encryption can be implemented in either hardware or software. Each has its related costs and benefits. The trade-offs among security, cost, simplicity, efficiency, and ease of implementation need to be studied when acquiring security products.

In general, software is less expensive and slower than hardware, although for large applications, hardware may be less expensive. In addition, software is less secure, since it is more easily modified or bypassed than some hardware products.

In many cases, encryption is implemented in a hardware device (such as a card/key entry system), but is controlled by software. This software requires integrity protection to ensure that the hardware device is provided with correct information (controls, data) and is not bypassed. Thus, a hybrid solution of software and hardware is generally provided. Effective security requires the correct management of the entire hybrid solution.

Key Management

All keys need to be protected against modification, and secret keys and private keys need protection against unauthorized disclosure. The proper management of cryptographic keys is essential to the effective use of encryption for security. Key management involves the procedures and protocols, both manual and automated, used throughout the entire life cycle of the keys. This includes the generation, distribution, storage, entry, use, destruction, and archiving of cryptographic keys. Ultimately, the security of information protected by encryption directly depends upon the protection afforded to keys.

With secret key encryption, the secret key(s) must be securely distributed (safeguarded against unauthorized replacement, modification, and disclosure) to the parties wishing to communicate. Depending on the number and location of users, this task may be difficult. Automated techniques for generating and distributing cryptographic keys can ease overhead costs of key management, but some resources have to be devoted to this task.

Public-key encryption users also have to satisfy certain key management requirements. For example, since a private/ public-key pair is associated with (generated or held by) a specific user, it is necessary to link the public part of the key pair to the user. In some cases, the key may be linked to a position or an organization, rather than to an individual user.

Complying with Export Rules

A number of governments have regulations regarding the import or export of encryption. The government controls the export of cryptographic implementations because it considers them part of munitions. As a general rule, the government allows encryption to be used when the data being encrypted is of a financial nature and the transaction is between known banks, the content of the data is well-defined, the length of the data is limited, and the encryption cannot easily be used for other purposes. The rules governing export

can be quite complex since they consider multiple factors. In addition, encryption is a rapidly changing field and rules may change from time to time. Questions concerning the export of a particular implementation should be addressed to appropriate legal counsel.

Other Business Issues

Three problems deter widespread acceptance of encryption for public commerce. First, successful encryption requires that all participating parties use the same encryption scheme. Second, the distribution of keys has prevented wider use of encryption, as there is no easy way to distribute the secret key to an unknown person on the network. The only safe way to communicate a key is in person, and even then the distributor must provide a different secret key for each person. Even public-key schemes require a method for key distribution.

The final deterrent to widespread acceptance of encryption is that it is difficult to use. For encryption to flourish, the encryption user interface must be simplified so that an average consumer can easily use the software. Currently, a consumer will not wait more than a few seconds for information access or retrieval. In the future, encryption will be done by fast hardware rather than software.

Legal Issues

As encryption becomes commonplace in the commercial world, employers will face the problem of producing documents that only certain employees can decrypt. Given labor force mobility, a company may be confronted with the task of producing documents encrypted by ex- employees who may not wish to cooperate.

Encryption raises a plethora of legal problems for corporations' including: Will courts tolerate the production of pivotal evidence in encrypted form? On what basis could counsel claim such a data file was irrelevant or privileged? Will the producer have the onus of contacting the ex-employee in the hope that the employee will remember the password necessary for decryption? Will the courts compel individuals to provide their passwords?

Protecting Networks: Firewalls and Proxy Servers

- **Firewall:** Software application that acts as a filter between a company's private network and the Internet
- Firewall methods include:
 - Packet filters
 - Application gateways
- Proxy servers: Software servers that handle all communications originating from for being sent to the Internet (act as "spokesperson" or "bodyguard" for the organization).

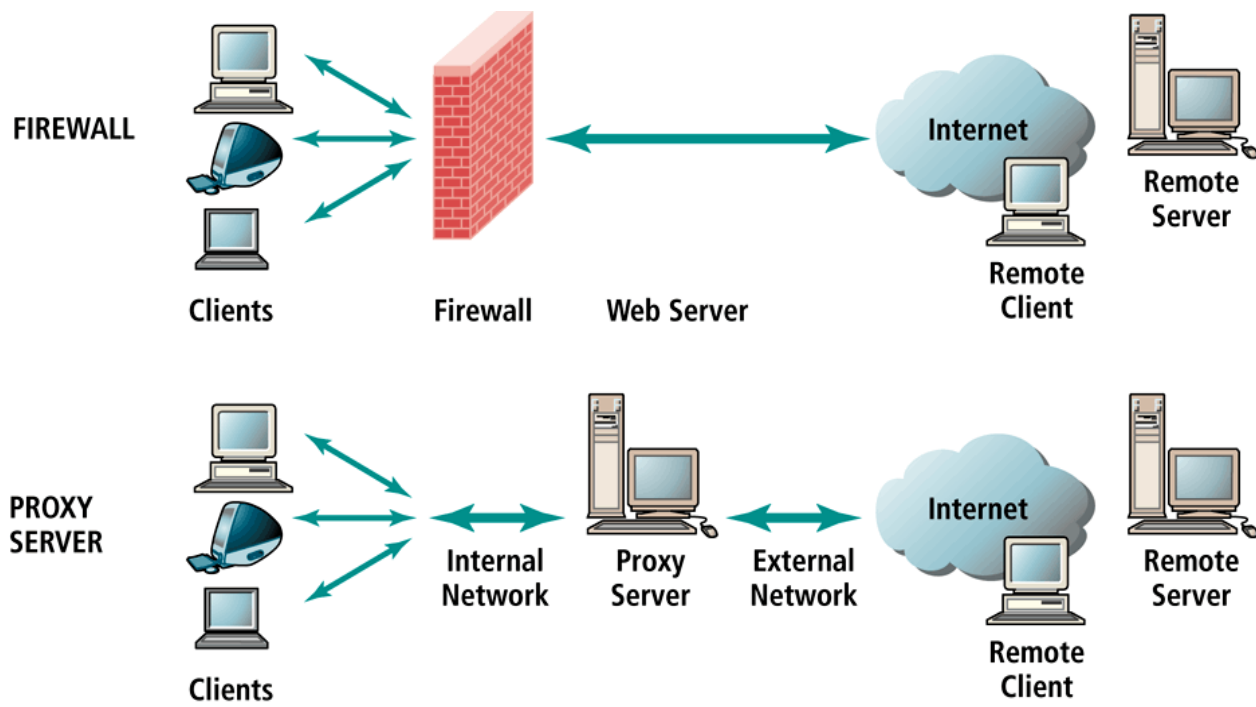


Figure 5.7--- Firewalls and Proxy Servers

Chapter VI

Electronic Payments

Learning Objectives:

- Describe EDI
- Describe the features of traditional payment systems
- Discuss the current limitations of online credit card payment systems
- Understand the features and functionality of digital wallets
- Describe the features and functionality of the major types of digital payment systems

6.1 Introduction to EDI

All Organization and administrative association with large information system faces a situation where typing and printing of all information arriving or leaving their domain is no longer feasible. Everyone who works in a business organization where hundreds and thousands of standard forms, (e.g. invoices) and received and responded to, knows how difficult it is to manage this task. These forms should be entered in the computer for processing, and response should be generated and posted to the concerned parties. The whole process is time-consuming and prone to human errors during data entry and expensive to operate.

Electronic Data Interchange (EDI) is the electronic exchange of business documents in a standard, computer process able, universally accepted format between-trading partners. EDI is quite different from sending electronic mail, messages or sharing files through a network. In EDI, the computer application of both the sender and the receiver, referred to as Trading Partners (TPs) have to agree upon the format of the business document which is sent as a data file over an electronic messaging service.

The two key aspects of EDI that distinguish it from other forms of electronic communication, such as electronic mail, are:

- *The information transmitted is directly used by the recipient computer without the need of human intervention.
- *The repeated keying of identical information.

The following problems can be reduced by using EDI:-

- Increased time
- Low accuracy
- High labour charges
- Increased uncertainty.

To take full advantage of EDI's benefits, a company must computerize its basic business applications. Trading partners are individual organization that agrees to exchange EDI transactions. EDI cannot be undertaken unilaterally but requires the cooperation and active participation of trading partners. Trading partners normally consists of an organization's principal suppliers and wholesale customers. Since large retail stores transact business with a large number of suppliers, they were among the early supporters of EDI. In the manufacturing sector, EDI has enabled the concept of Just-In-Time inventory to be implemented. JIT reduces inventory and operating capital requirements.

Costs and Benefits

Wherever the EDI has been implemented, computers electronically exchange business documents with each other, without human intervention. This only reduces the operating costs, administrative errors, and delivery delays. The benefits accruing from EDI implementation can be broadly classified into direct benefits and long-term strategic benefits.

Direct Benefits

- The transfer of information from computer to computer is automatic.
- Cost of processing EDI documents is much smaller than that of processing paper documents.
- Customer service is improved.
- The quick transfer of business documents.
- Information is managed more effectively.
- There is a improved job satisfaction among the data entry operators, clerks etc.

Strategic Benefits

- Customer relations are improved through better quality and speed of services.
- Competitive edge is maintained and enhanced.
- Reduction in product costs can be achieved.
- Business relations with trading partners are improved.
- More accurate sales forecasting and business planning is possible due to information availability at the right place at the right time.

Networking Infrastructure for EDI

- For the successful functioning EDI, it assumes availability of a wide area network to which organization can subscribe.
- All organization that is willing to join EDI services must subscribe to the common network.
- In addition, all organization participating in a EDI service-group that they will use, and load appropriate EDI software on their compute systems. This software is responsible for providing translation services.

Functioning of EDI

Any organization using EDI communicates with their Trading partners, in one of the two ways:

- Exchange of data with several trading partners directly.

- Interaction with multiple companies through a central information-clearing house.

(see the figure below)

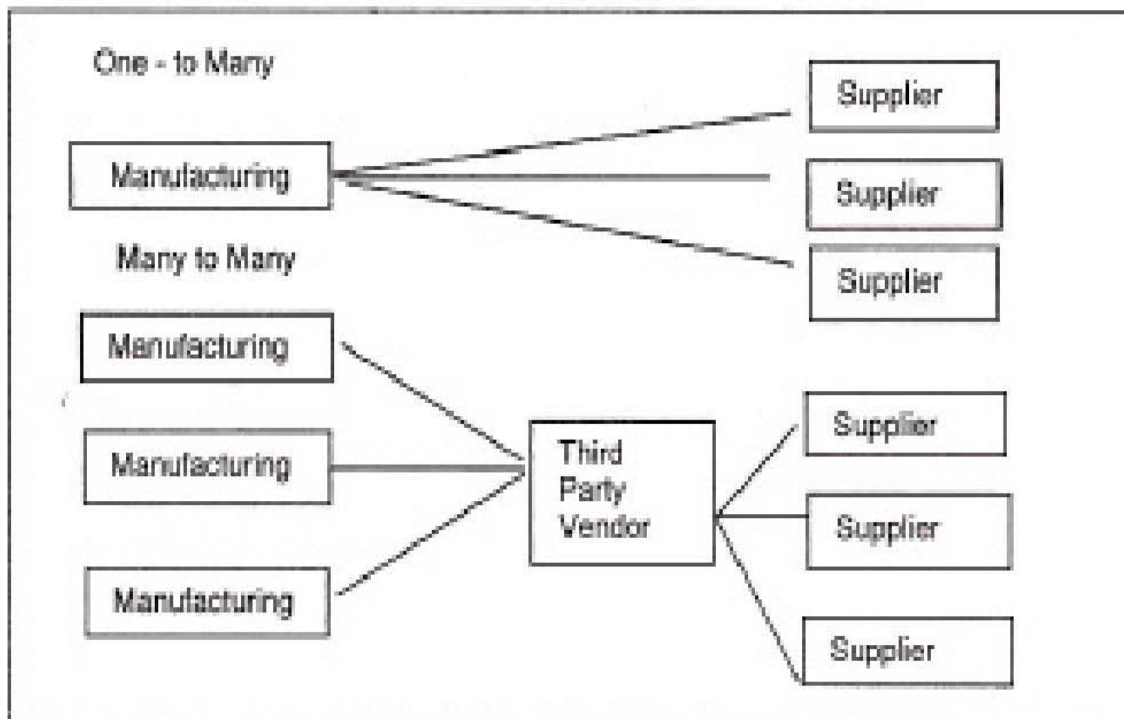


Figure 6.1- functioning of EDI

In the latter case, all transaction takes place through a third party's computer system, which then sends them to the appropriate receiver's computer. This enables the sender to communicate with an unlimited number of trading partners without worrying about the proprietary system audit trails, variables transmission speeds, and general computer compatibility.

EDI Works in the Following Manner:

- Prior to any computer work, representatives of two companies interested in exchanging data electronically meet to specify the application in the EDI standards, which they will implement.
- The two companies exchange data electronically in the standard formats.
- Each company-adds EDI program to its computer to translate the company data into standard formats for transmission, and for the reverse translation in the data it receives.

The sender transmits the database formatted in the EDI standards to the receiver who then translates the formatted message to a computer record to be processed and used internally. All transmission is checked both electronically and functionally and the protocol includes procedure for the error detection and correction.

Once a company has established standardized communications with another company, it is now in a position to communicate with any other company that is also using the EDI standards.

EDI Components

A typical EDI system converts generic EDI messages (in EDIFACT or any other EDI standards) format to RDBMS format and from RDBMS format to EDI format. RDBMS database contains the data to be translated into EDI format and where EDI data to be converted (and written) to. EDI configuration programs do these translations.

There are three main components of an EDI system as shown in figure.

1. Application Service.
2. Translation Service
3. Communication Service

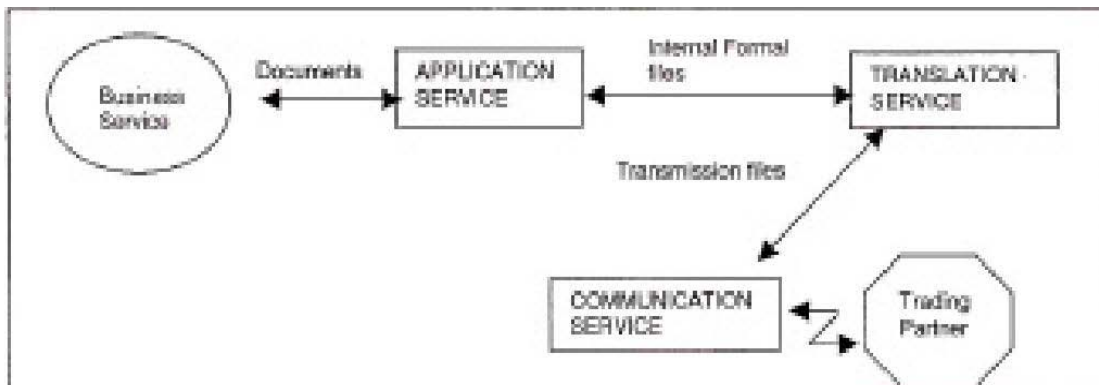


Figure 6.2- components of EDI

EDI Services

The three EDI services all performs three different tasks.

Application Service

The Application Service provides the link between a business application and EDI. It allows us to send document to, and receive documents from an EDI system.

A set of callable routines is used to transfer documents from the business application into EDI. Documents destinations can is either intra-company or to external companies, Le., trading partners.

The EDI Application Service holds each incoming and outgoing document as a single internal format file.

EDI converts the document to a standard format and sends it to be the trading partner the relevant communication protocol. A number of different standards and communication protocols are available.

The below list describes what happens in the Application Services:

For Outgoing Documents:

- The business application uses the callable routines to send a document from the business application to the Application Service. The document is now in the EDI system and is called internal format file.
- The Application Service sends the document in the internal format file to the Translation Service.

For Incoming Documents:

The Application Service receives an internal format file from the Translation Service.

The Application Service makes the data in the internal format file available in database so that the business application can fetch the document from EDI. A callable interface is used to do this.

The figure , it displays the application service:

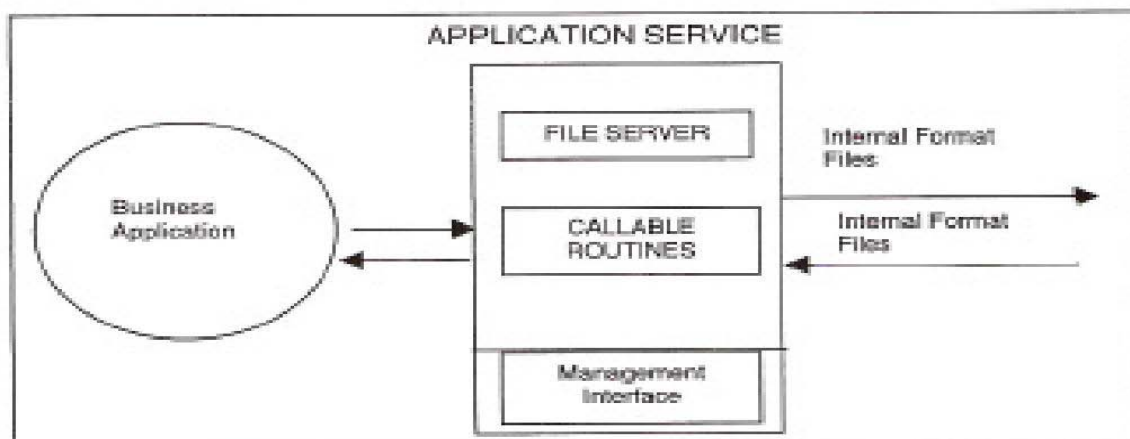


Figure 6.3- Application service

Translation Service

Translation service converts outgoing documents from an internal format file to an agreed external format.

It translates incoming documents from an external format to the EDI internal format file.

The external document standards that an EDI system supports are EDIFACT, X12, TDCC, and ODETTE.

For outing documents:

The Translation Service receives a document in the internal format file from the Application Service. It converts the internal format file from the Application Service. It converts the internal format file to the appropriate external standard (either EDIFACT, X12, TDCC, or ODETTE) to the internal format file.

The file is now an internal format file.

The Translation Service combines one or more external format file into a transmission file.

The Translation Service now sends the transmission file to the communication Services.

For incoming documents:

- The translation Service receives a document in the transmission file from the communication Service.

It separates the transmission file to produce external format files.

It translates each external format file, which may be in an external standard (either EDIFACT, X12, TDCC, or ODETTE) to the internal format file. The file is now an internal format file.

The Translation Service now sends the internal format file to the Application Service.

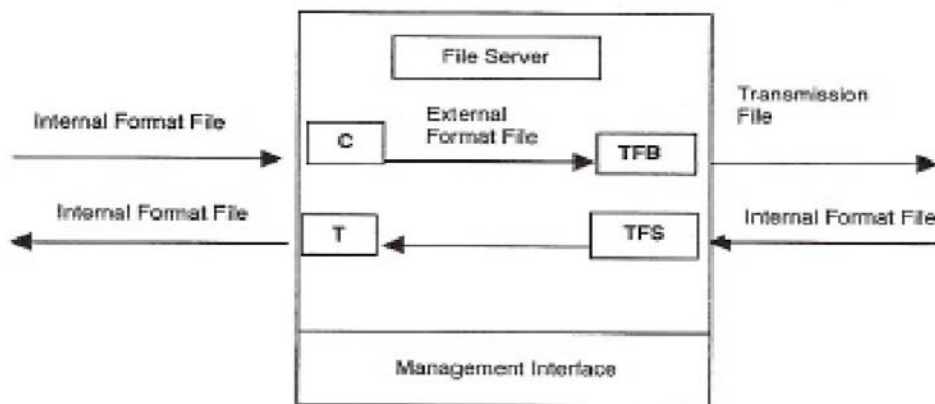


Figure 6.4- Translation service

Communication Service

The communication Service sends and receives transmission files to and from the trading partners either directly or by using a third party service called a Value Added Network (VAN).

The list below describes what happens in the Communication Service:

For outgoing Documents:

- The Communication Service receives a transmission file from the Translation Service. It checks the file to see which trading partner it has been sent to. When it has identified the type of connection to be used for this trading partner it determines which gateway to use.
- The Communication Service sends the Transmission file to the Translation Service.

For Incoming Documents:

The Communication Service receives a transmission file from the trading partner. The file arrives through one of the gateways that EDI support.

The Communication Service sends the transmission file to the Translation Service.

Refer figure, shows the Communication service.

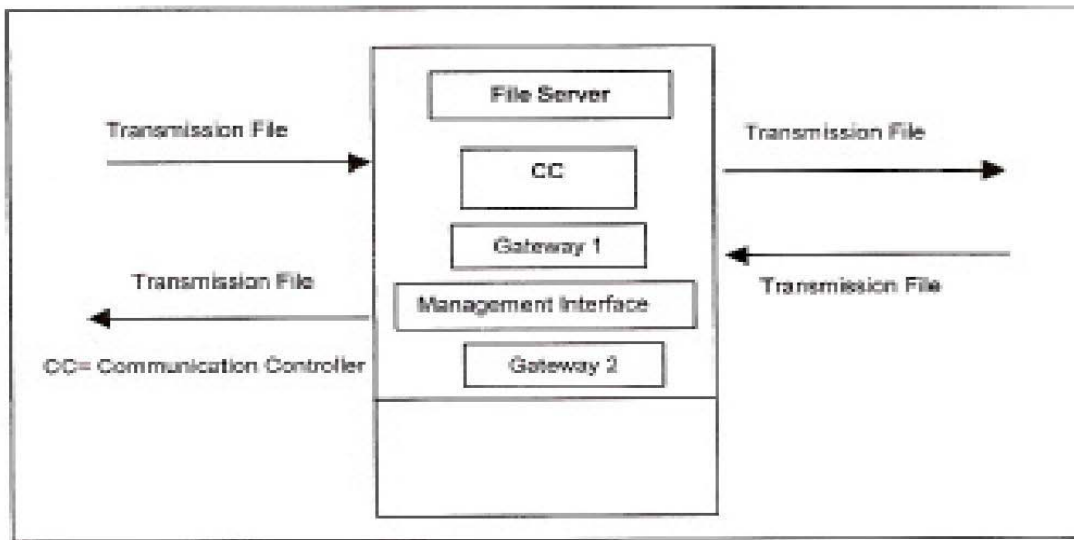


Figure 6.5- Communication service

File Types in EDI

EDI creates the following files as a document passes through the system..

- Internal Format File (IFF)
- External Format File (EFF)
- Transmission File (TF)

Internal Format File

Internal Format File (IFF) contains a single document for a single trading partner. Internal Format File is principally for EDI's own use.

External Format File

External Format File (EFF) contains the same data as the internal format file translated into the appropriate standard document format.

Transmission File

Transmission file contains one or more documents for the same trading partner. Documents of the same type are packaged together in functional groups. The functional 'groups' going to one trading partner are packaged into an interchange set. An interchange set contains one or more functional groups of documents with the same sender and receiver.

6.2 Electronic Payment Systems

In order to understand e-commerce payment systems, we first need to be familiar with various types of generic payment systems. Then we will be able to clarify the different requirements that e-commerce payment systems must meet and identify the opportunities provided by e-commerce technology for developing new types of payment systems.

Types of Payment Systems:

- Cash
- Checking Transfer
- Credit Card
- Stored Value
- Accumulating Balance

Cash:

- Legal tender defined by a national authority to represent value
- Most common form of payment in terms of number of transactions
- Instantly convertible into other forms of value without intermediation of any kind
- Portable, requires no authentication, and provides instant purchasing power
- “Free” (no transaction fee), anonymous, low cognitive demands
- Limitations: easily stolen, limited to smaller transaction, does not provide any float

Checking Transfer:

- Funds transferred directly via a signed draft or check from a consumer’s checking account to a merchant or other individual
- Most common form of payment in terms of amount spend
- Can be used for both small and large transactions
- Some float
- Not anonymous, require third-party intervention (banks)

- Introduce security risks for merchants (forgeries, stopped payments), so authentication typically required

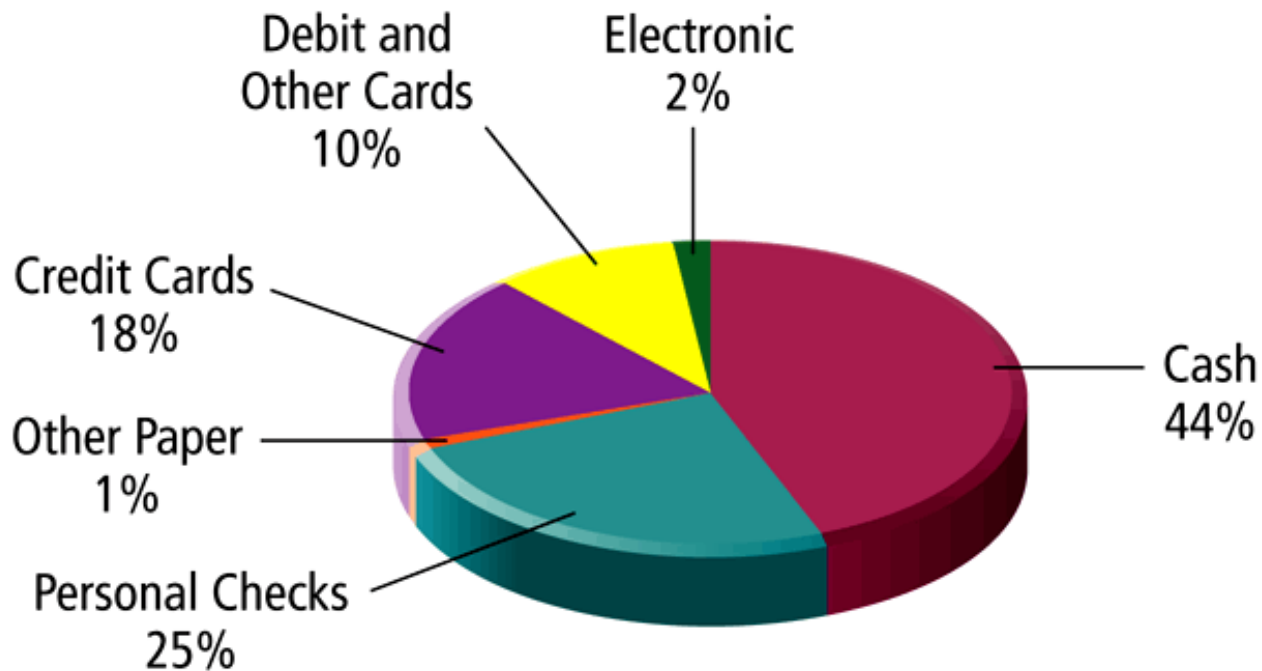


Figure 6.6- Most Common Payment Systems, Based on Number Of Transactions

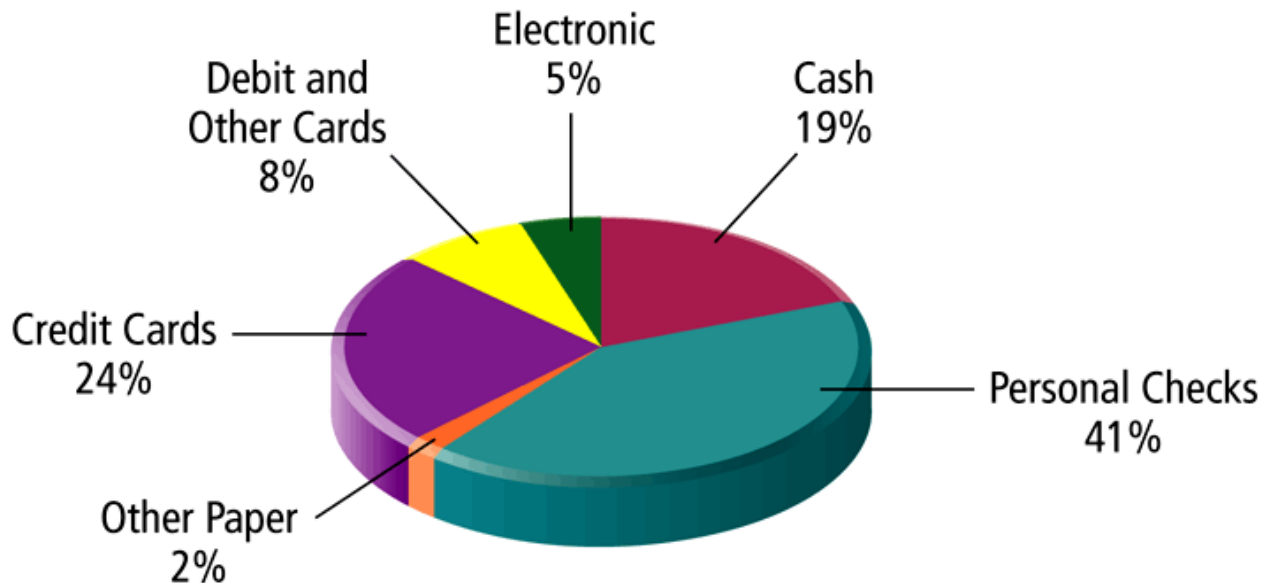


Figure 5.7- Most Common Payment Systems, Based on Amount

Credit Card:

- Represents an account that extends credit to consumers, permitting consumers to purchase items while deferring payment, and allows consumers to make payments to multiple vendors at one time
- Credit card associations – Nonprofit associations (Visa, MasterCard) that set standards for issuing banks

- Issuing banks – Issue cards and process transactions
- Processing centers (clearinghouses) – Handle verification of accounts and balances

Stored Value:

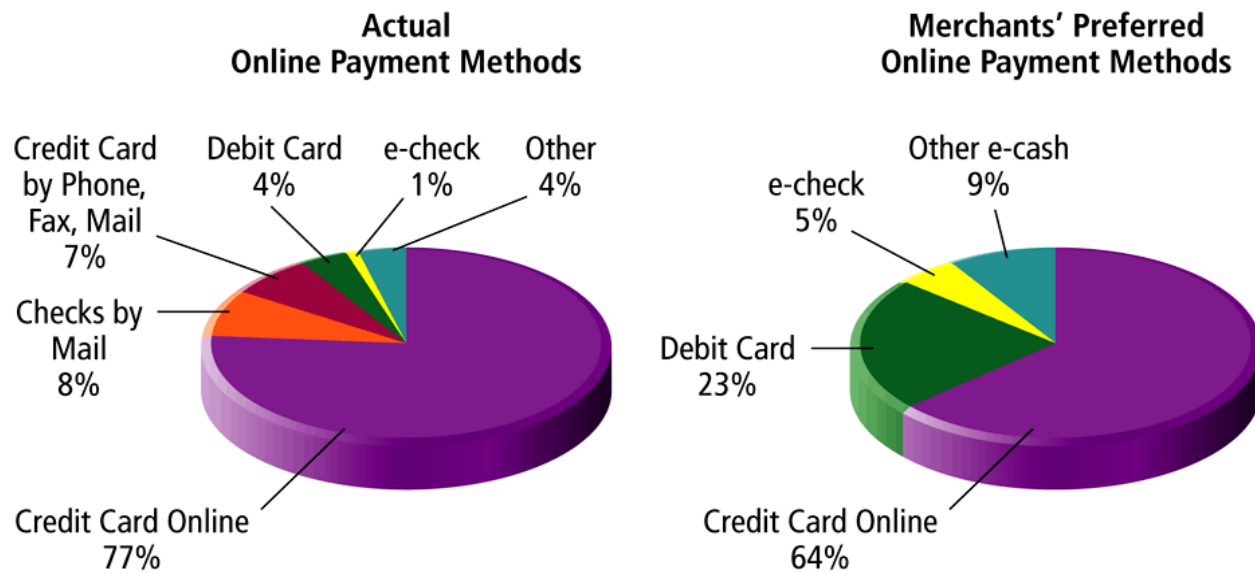
- Accounts created by depositing funds into an account and from which funds are paid out or withdrawn as needed
- Examples: Debit cards, gift certificates, prepaid cards, smart cards
- Debit cards: Immediately debit a checking or other demand-deposit account
- Peer-to-peer payment systems such as PayPal is a variation

Accumulating Balance:

- Accounts that accumulate expenditures and to which consumers make period payments
- Examples: utility, phone, American Express accounts

6.3 Current Online Payment Systems

- Credit cards are dominant form of online payment, accounting for around 80% of online payments.
- New forms of electronic payment include:
 - Digital cash
 - Online stored value systems
 - Digital accumulating balance payment systems
 - Digital credit accounts
 - Digital checking



* Percentages total more than 100% due to rounding

Figure 6.8- Online Merchants' Actual and Preferred Online Payments

How an Online Credit Card Transaction Works

- Processed in much the same way that in-store purchases are
- Major difference is that online merchants do not see or take impression of card, and no signature is available (CNP transactions)
- Participants include consumer, merchant, clearinghouse, merchant bank (acquiring bank) and consumer's card issuing bank

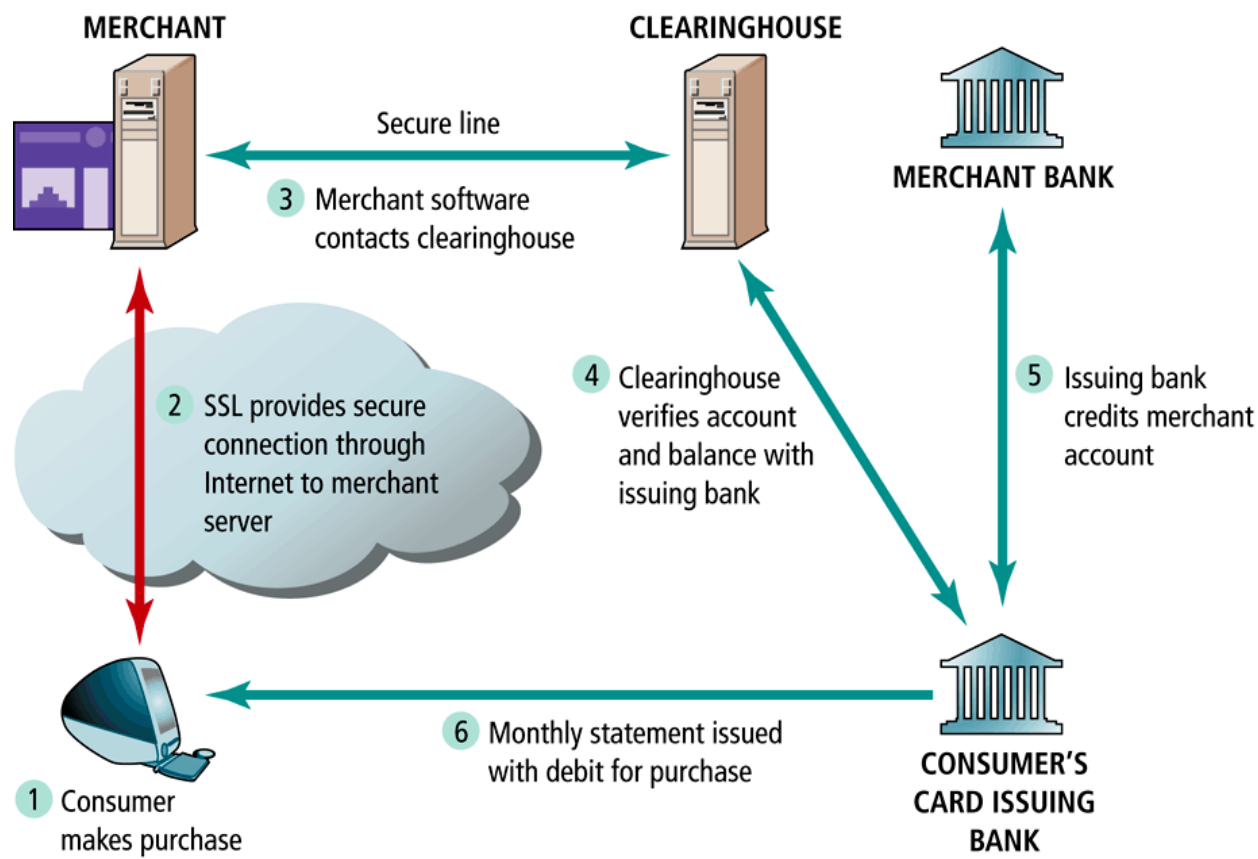


Figure 6.9- How an Online Credit Transaction Works

Limitations of Online Credit Card Payment Systems

- Security – neither merchant nor consumer can be fully authenticated
- Cost – for merchants, around 3.5% of purchase price plus transaction fee of 20-30 cents per transaction
- Social equity – many people do not have access to credit cards (young adults, plus almost 100 million other adult who cannot afford cards or are considered poor risk)

The SET (Secure Electronic Transaction) Protocol

- Authenticates cardholder and merchant identity through use of digital certificates
- An open standard developed by MasterCard and Visa
- Transaction process similar to standard online credit card transaction, with more identity verification
- Thus far, has not caught on much, due to costs involved in integrating SET into existing systems, and lack of interest among consumers

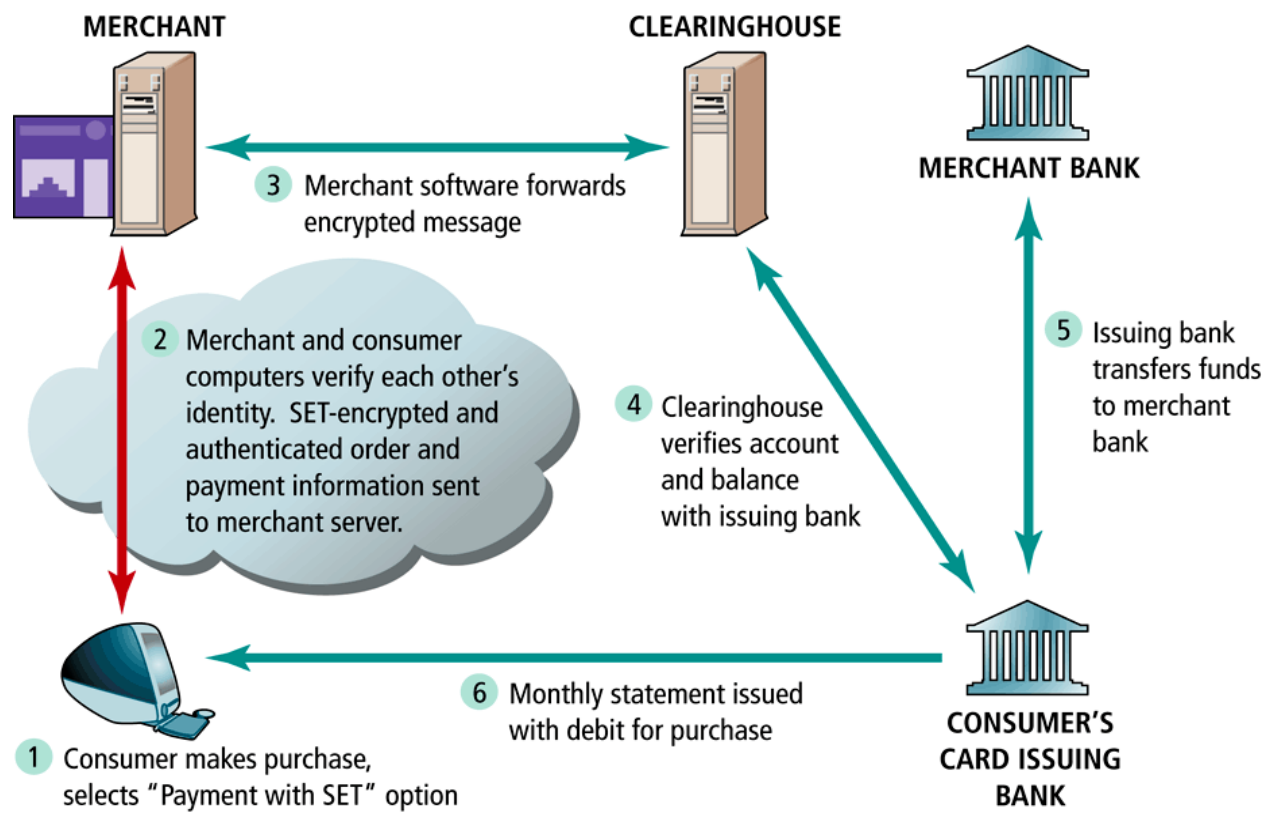


Figure 6.10- How SET Transactions Work

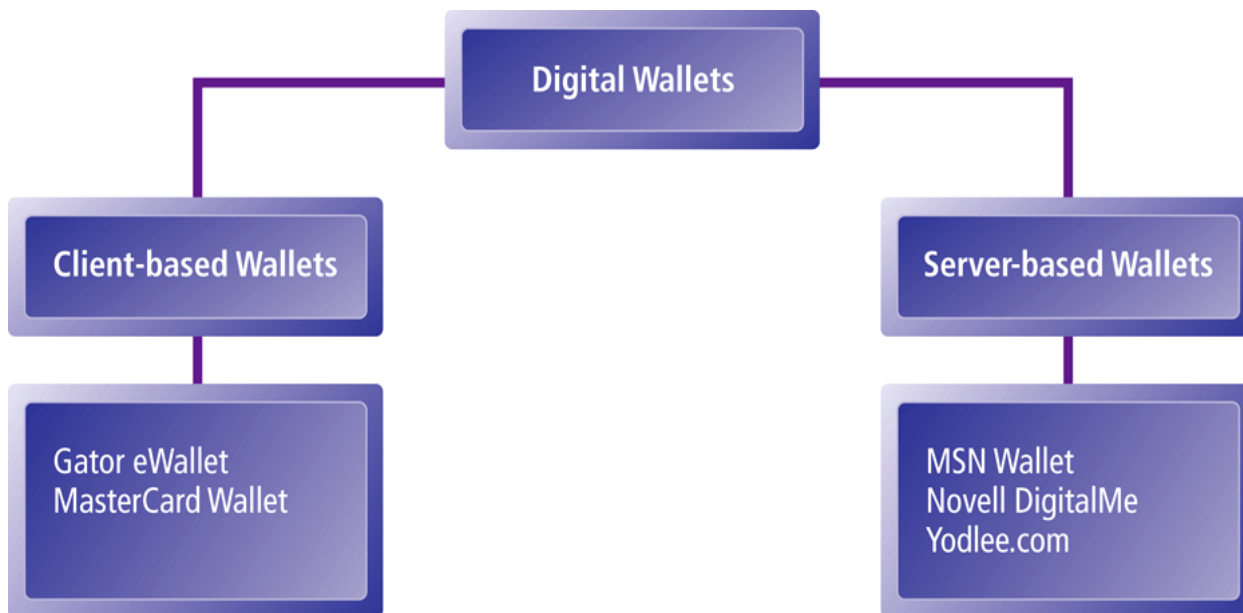
6.4 Digital Wallets

- Concept of digital wallet relevant to many of the new digital payment systems
- Seeks to emulate the functionality of traditional wallet
- Most important functions:
 - Authenticate consumer through use of digital certificates or other encryption methods
 - Store and transfer value
 - Secure payment process from consumer to merchant
- Two major categories:
 - Client-based digital wallets – Gator.com, MasterCard Wallet
 - Server-based digital wallets – MSN Wallet

Promised Functionality of Digital Wallets:

FUNCTION	DESCRIPTION
Authentication	Confirms identities via digital certificates, SET, or other forms of encryption.
Processing of payments	Pays bills via alliances with credit card associations and banks.
Privacy/password management	Helps customers control their digital environments, PINs, card numbers, and passwords in a secure product.
Receipt management	Reviews all transactions at a single source.
Bill presentment	Presents and pays bills at a single location.
Loyalty programs	Participates in and manages loyalty points at a single location.
Coupon delivery/discounts	Coordinates merchant promotions through a single wallet.
Spending allowances	Establishes e-allowances.
Micropayments	Makes payments under \$5 anywhere on the Web based on credit cards.
Integration with other software	Links to taxation software, personal budgets, personal devices, and wireless software.

Types of Digital Wallets:



6.5 Digital Cash

- One of the first forms of alternative payment systems
- Not really “cash” – rather, are forms of value storage and value exchange that have limited convertibility into other forms of value, and require intermediaries to convert
- Many of early examples have disappear; concepts survive as part of P2P payment systems

Examples of Digital Cash:

NAME OF SYSTEM	YEAR FOUNDED/DESCRIPTION
First Virtual	1994. First secure stored value system based on credit cards, pre-use deposits, and PIN numbers. Ceased operations in 1998.
DigiCash (now e-Cash)	1996. Encryption-based prepaid stored value system requiring digital wallet on hard drive to store e-coins. Ceased operations in 1998, returned as e-Cash Technologies. Acquired by InfoSpace in February 2002.
Millicent	1996. Digital Equipment Corporation's entry into micropayment e-cash. Not currently being used.
<i>PEER-TO-PEER PAYMENT SYSTEMS</i>	
PayPal	1999. Free P2P micropayment system.
Yahoo PayDirect	1999. Free Yahoo P2P payment service.
MoneyZap	1999. Western Union fee-based money transfer system.

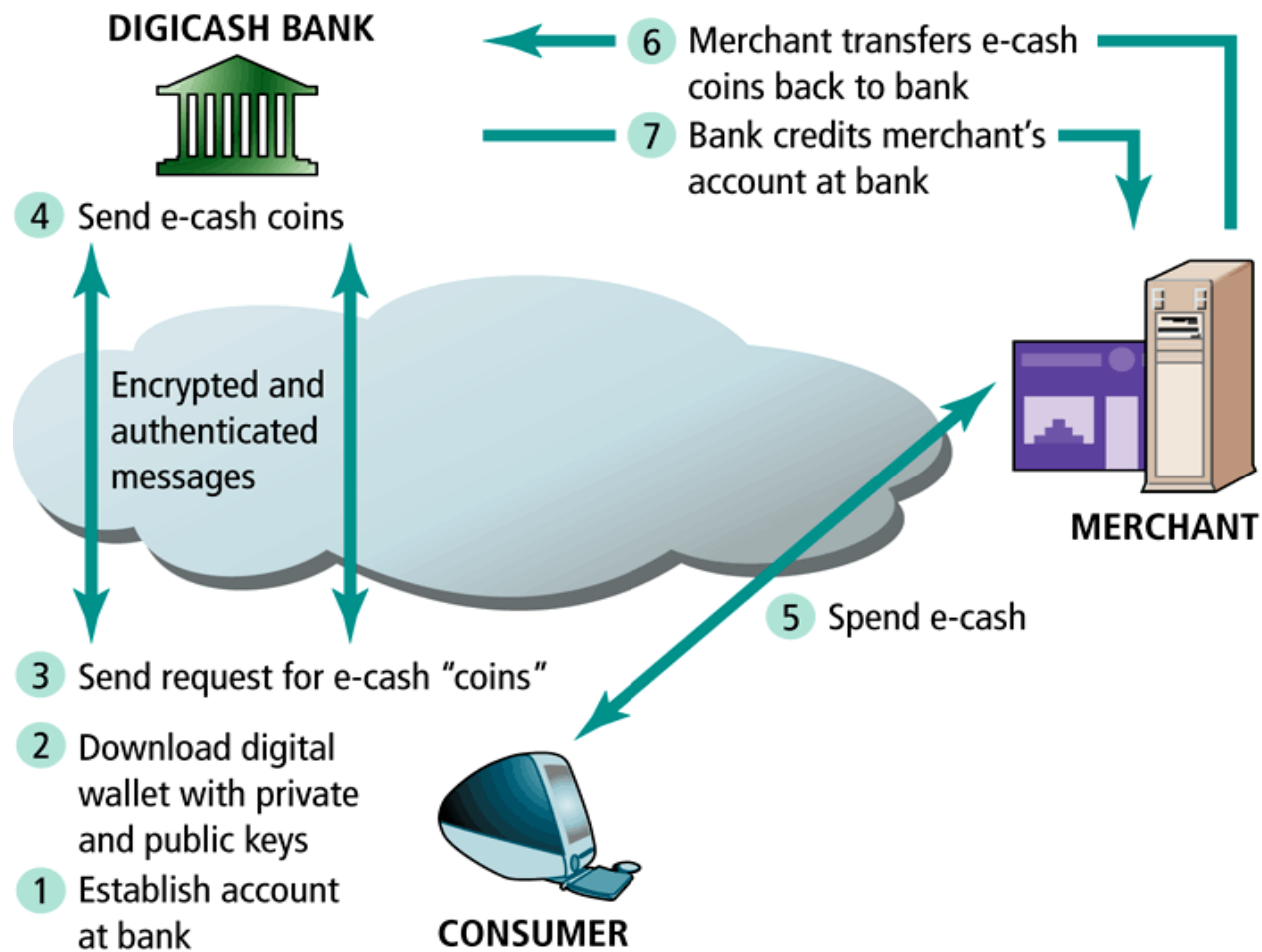


Figure 6.11- Digicash: How First Generation Digital Cash Worked

6.6 Online Stored Value Systems

- Permit consumers to make instant, online payments to merchants and other individuals based on value stored in an online account
- Rely on value stored in a consumer's bank, checking or credit card account

Examples of Online Stored Value Systems:

SYSTEM	YEAR FOUNDED/DESCRIPTION
Ecount	1998. Prepaid debit account
ECharge	1997. Prepaid account with digital wallet
Millicent	1998. Micropayment system designed for selling digital content. No longer offered
Peppercoin	2001. Micropayment system for purchases less than \$1.00
Qpass	1997. Wireless and online prepaid stored value micropayment system
<i>SMART CARDS</i>	
Mondex	1994. Smart card, stored value system in which value is stored on a chip on the card
American Express Blue	1999. Combined credit and smart card

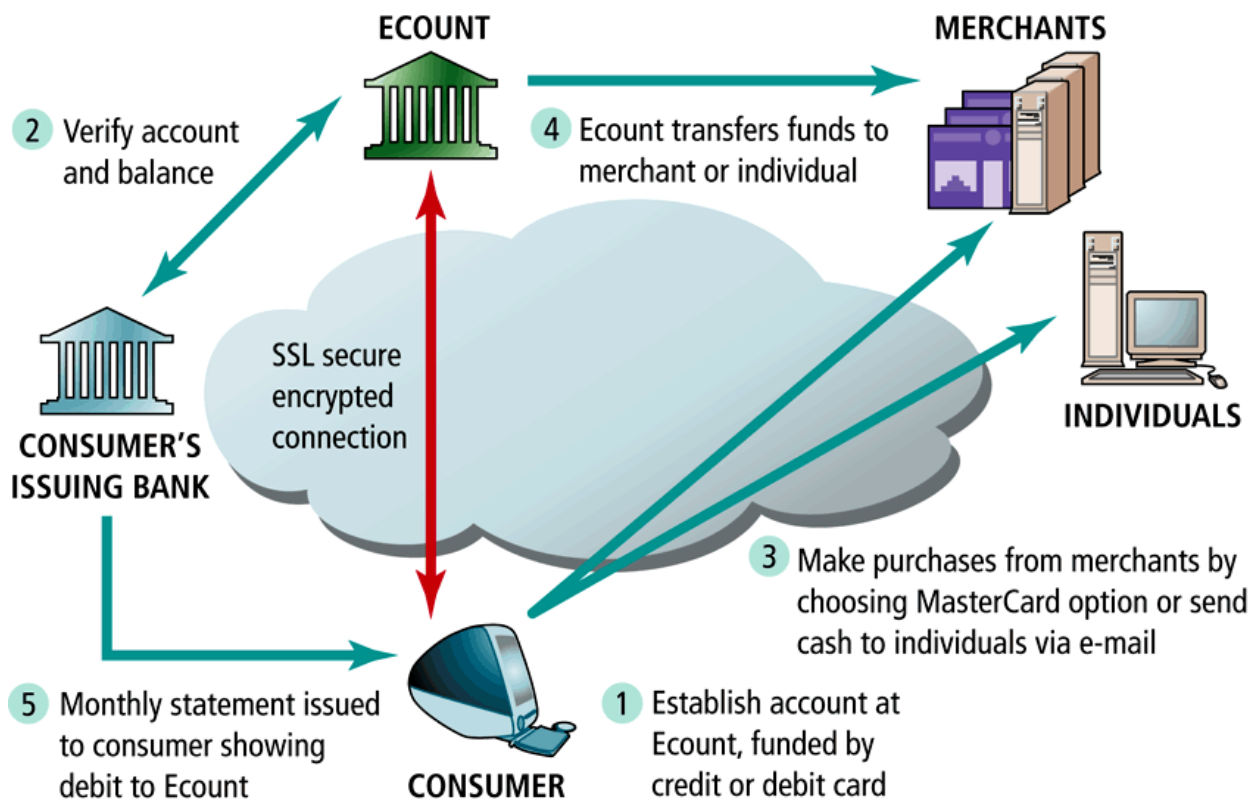


Figure 6.12- How Ecount.com Works: A Stored Value System

Smart Cards as Stored Value Systems

- Another kind of stored value system based on credit-card sized plastic cards that have embedded chips that store personal information
- Two types:
 - Contact
 - Contactless
- Examples: Mondex, American Express Blue

6.7 Digital Accumulating Balance Payment Systems

- Allows users to make micropayments and purchases on the Web, accumulating a debit balance for which they are billed at the end of the month
- Examples: Qpass and iPin

Examples of Digital Accumulating Balance Payment Systems:

SYSTEM	YEAR FOUNDED/DESCRIPTION
Qpass	1997. Integrated server side merchant platform for accumulating customer micro-payments.
iPIN	1997. Integrated payment platform with accumulated balance capability and flexible authentication procedures.

6.8 Digital Credit Card Payment Systems

- Extend the functionality of existing credit cards for use as online shopping payment tools
- Focus specifically on making use of credit cards safer and more convenient for online merchants and consumers
- Example: eCharge

Examples of Digital Credit Card Payment Systems:

SYSTEM	YEAR FOUNDED/DESCRIPTION
CyberCash	1998. Credit card enabler. Server-based digital wallet platform. Acquired by VeriSign in 2002.
eCharge Credit	1997. eCharge allows consumers to charge online payments to a credit card account. Digital wallet download required.

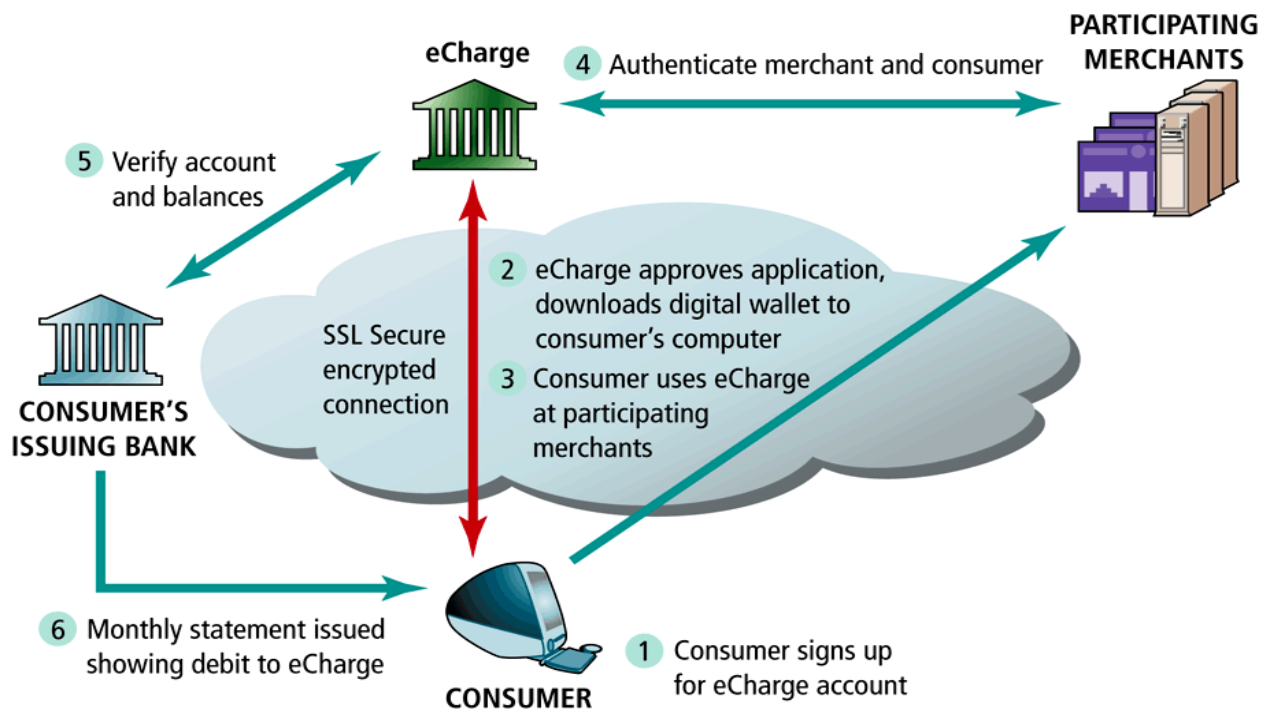


Figure 6.13- How a Digital Credit Card Payment Systems Works: eCharge

6.9 Digital Checking Payment Systems

- Extend the functionality of existing checking accounts for use as online shopping payment tools
- Examples: eCheck, Achex (MoneyZap)

Examples of Digital Checking Payment Systems:

SYSTEM	YEAR FOUNDED/DESCRIPTION
ECheck	1998. Consortium of 15 banks, government agencies, and technology companies (Echeck.org). Secure electronic checking system. Digital wallet required.
Achex/Western Union	1999. Simple check-extension system. No digital wallet. Pay from existing checking account. Now known as MoneyZap.

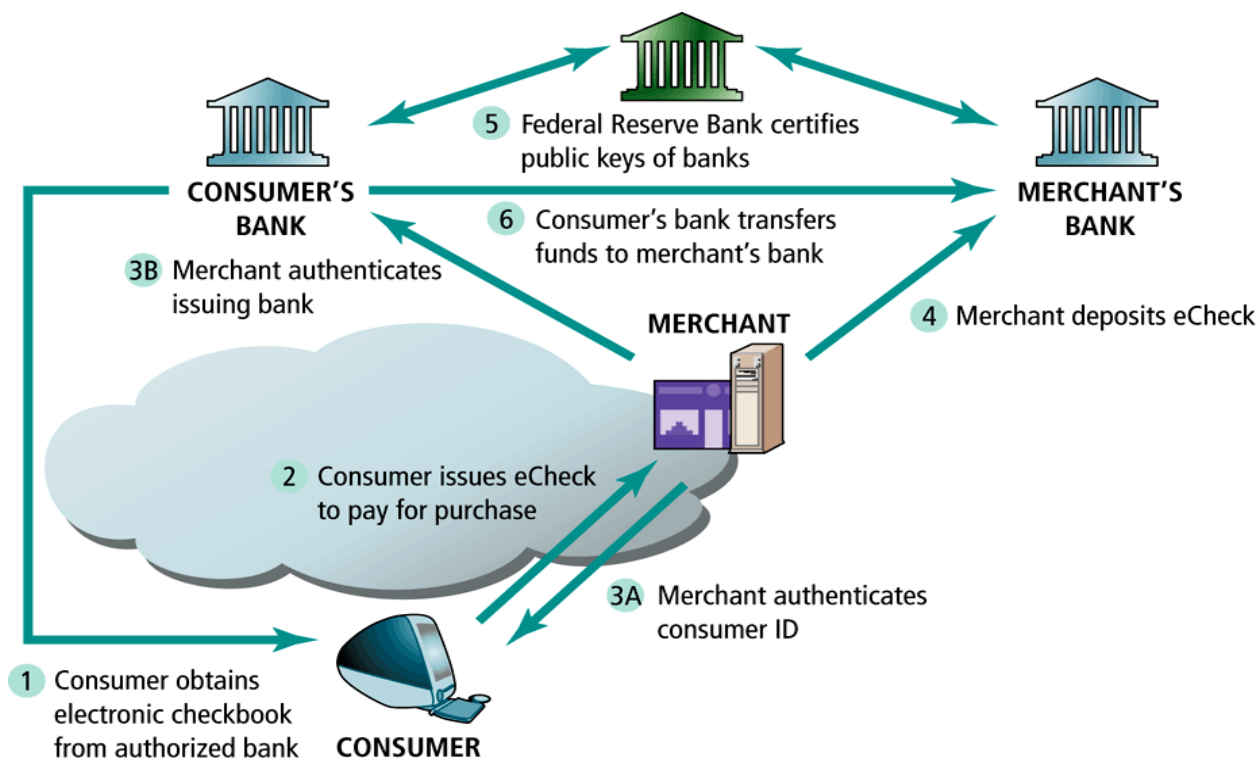


Figure 6.14- How Digital Checking Works: eCheck

Chapter VII

Business Concepts And Social Issues

Learning Objectives:

- Describe Business trident(SCM,CRM,ERP)
- Discuss the basic concepts of consumer behavior and marketing
- Describe the basic marketing concepts need to understand Internet marketing
- Identify and describe the main technologies that support online marketing
- Identify and describe basic e-commerce marketing and pricing strategies
- Describe main ethical, social and political issues
- Discuss the concepts related to privacy, intellectual property and public welfare

7.1 E-Business Trident

The three prongs of the E-business initiative, which would set apart a successful firm, are :

- a. **E-SCM** - Electronic Supply Chain Management.
- b. **E-CRM** - Electronic Customer Relationship Management
- c . **ERP** - Enterprise Resource Planning

E-SCM:

What is supply chain management?

In the simplest sense, the supply chain is a series of processes until the final product reaches the hands of the customer.

Electronic Supply Chain Management

The Electronic Supply Chain Management is a business framework consisting of many applications such as EDI, EFT etc. These applications have been divided into two categories -

- a. Applications concerning planning.
- b. Applications concerning execution.

The planning application focuses on demand forecasting, inventory simulation, distribution, transportation, and manufacturing planning and scheduling. Planning software is designed to improve forecast accuracy, optimize production scheduling, reduce inventory costs, decrease order cycle times, reduce transportation costs, and improve customer costs, decrease order cycle times, reduce transportation costs, and improve customer service.

The execution process addresses procuring, manufacturing and distributing products throughout the value chain. Supply chain execution applications are designed to manage the flow of products through distribution centres and warehouses and help ensure that products are delivered to the right location using the best transportation alternative available.

Descriptions of each of the categories of supply chain management applications are given below.

Elements of Supply Chain Planning

The various applications that come under Supply Chain Planning are

1. Advanced Scheduling

This provides a detailed coordination of all manufacturing and supply efforts based on individual customer orders. Scheduling is based on real-time analysis of changing constraints throughout the process, from equipment outages to supply interruptions. Scheduling is much more execution oriented and creates job schedules for managing the manufacturing process as well as the supplier logistics.

Demand Planning

This would generate and consolidate demand forecasts from all business units in large corporations. The demand-planning module supports a range of statistical tools and business forecasting techniques.

Distribution Planning

This would create operating plans for the logistic managers. Distribution planning is integrated with demand planning and advanced scheduling modules and hence gives the operating plan for fulfilling orders.

Transportation Planning

This facilitates resource allocation and execution to ensure that materials and finished goods are delivered at the right time and to the right place, according to the planning schedule, at minimal cost. This includes inbound and outbound, intra- and inters- company movement of materials and products. It considers such variables such as loading dock space, trailer availability, load consolidation, and the best mix of available transportation modes.

Elements of Supply Chain Execution

The supply chain execution module would have the following applications-

Order Planning

This application would select the plan that best meets the desired customer service levels with respect to the transportation and manufacturing constraints. Increasingly, the firms have to plan backward from customer priorities and fulfilment deadlines.

Production

This application would start with the master production schedule for the finished product, and then generates an MRP (Material Requisition Planning) to determine when, where and in what quantities various sub-assemblies and components are required to make each product.

Replenishment

This application would help in minimizing the amount of inventory in the pipeline and coordinate product handoffs between the various parties that are involved.

E-CRM:**What is Customer Relationship Management**

Increased competition, globalization, the growing cost of customer acquisition, and high customer turnover are major issues in organizations today. CRM is a combination of business process and technology that understand a company's customers from a multi faceted perspective: who are they, what they do and what they like?

Research shows that effective management of customer relationships is an important source of competitive differentiation. In today's world, the only way for an organization to succeed is to focus diligently on the needs of the customer. To keep the best customers, management must concentrate its energies on quickly and efficiently creating new delivery channels, capturing massive amounts of customer data, and tying it all together to create an unique experience.

Customer life cycle: The three phases of CRM

There are three phases of CRM: Acquisition, Enhancement and Retention. Each has a different impact on the customer relationship and each can more closely tie a firm to its customers. The three phases of CRM have been explained below:

Acquiring New Customers

You acquire new customers by promoting product/service leadership that pushes performance boundaries with respect to convenience and innovation. The value proposition to the customer is the offer of a superior product backed by excellent service.

Enhancing the Profitability of Existing Customers

You enhance the relationship by encouraging excellence in cross-selling and up-selling. This deepens the relationship. The value proposition to the customer is an offer of greater convenience at lower cost.

Retaining profitable customers for life

Retention focuses on service adaptability - delivering not what the market wants, but what the customer wants. The value proposition to the customer is an offer of a proactive relationship that works in his or her best interest. Today, leading companies focus on retention much more than on attracting new customers This because the cost of attracting a new customer is higher than the cost of retaining an existing customer.

CRM Architecture

This architecture consists of a group of applications that are organized around the customer, rather than marketing sales or any other internal function. Measurements and feedback from the customer drive the drive improvements in the CRM process. The customer's viewpoint becomes an integral part of the process, allowing it change with the customer need.

However, before aggressively deploying CRM applications, managers might have to restructure customer-interaction processes. Functional and organizational structures tend to compartmentalize the various activities that go into serving the customer. Such fragmentation prevents customer information from being dispersed far enough within the organization to be useful. In fact it often stands in the way of efforts to build a relationship. As a result, customized service is difficult and consequently organizations tend to treat all customers the same.

To counter fragmentation, leading edge companies strive to take a more customer centered approach to CRM. There is a growing trend towards managing all the activities that identify, attract, and retain customers in an integrated fashion, that is, managing them as a process that cuts across functional departments. By addressing these activities as a set of CRM processes, organizations can create end-to-end communications and performance accountability for entire sets of activities.

Portfolio of CRM process competencies

The core CRM process competencies are cross selling and up selling, direct marketing and fulfilment, customer service and support, store front and field service and retention management.

An brief description of each of these modules are given below -

Cross-selling and Up-selling

By implementing a cross-sell strategy, it is necessary to track customer contacts, triggers can be established to identify prospects for additional sales. For example, in a bank an event would be a large deposit, which would then trigger a sales person to call the customer and ask if she or he would be interested in investment options. Cross-sell and up-sell application may be used to schedule sales calls, keep detailed records of sales activities, and check on the status of the customer orders.

Cross-selling and up-selling depend on identifying life-path needs. For instance, in the finance industry, banks are attempting to build lasting relationships with customers by

matching their life-path needs to complementary products and services. As customers approach retirement, banks could recommend assets such as money markets, bonds and annuities. If customers with young children can be identified, then banks could cross-sell education savings plans or even loan consolidation plans.

Direct Marketing and Fulfilment

This includes pre-sale interaction such as advertising that either influences or provides potential customers with the necessary information to make a purchase decision. Marketing automation is critical, as organizations grow larger. This is because, it becomes more difficult to manage multiple simultaneous programs and track costs across multiple channels. Campaign management, a direct marketing process, allows companies to manage, integrate and leverage marketing programs by automating such tasks as managing responses, qualifying leads, and arranging logistical aspects of events.

Another critical core competency is fulfilment. Marketing departments today are being deluged with requests for information via the Web and other channels. The goal of effective fulfilment is to provide a myriad of information to customers and prospects quickly, easily and efficiently. Whether it is product or service inquiries, direct mail responses, pricing or billing issues, or requests for literature, responding to requests in a timely manner is critical. This creates a need for fulfilment capabilities that can get product information, literature, collateral packages, or other correspondence into the hands of the customers and prospects when they are most receptive. Effective fulfilment is not trivial; it requires a sophisticated interface with campaign management, sales force automation, and posting systems.

Customer Service and Support

Customer support provides customer care and other services. The applications include support for service request management, account management, contact and activity management, customer surveys, return material authorizations, and detailed service agreements. These discrete applications work together to ensure that customer service representatives can quickly assign, create and manage service requests, as well as look up detailed information about customer service contracts, contacts and activities.

Customer support capabilities are used to manage customers who are having problems with a product or service and to resolve those problems. Help-desk software automates the management and resolution of support calls and improves efficiency and effectiveness. These applications typically include capabilities to verify customer status (e.g., what level of support they are entitled to) track specific tasks needed to resolve problems across multiple

workgroups, monitor service-level agreements, maintain permanent incident histories, and capture support costs for charge backs. Armed with this complete customer and product information, service professional can resolve customer issues efficiently and effectively.

Field Service Operations

Field service is the hands-on extension of external customer support, activated when a problem can be solved over the phone and requires sending a repair person to the customer site to perform maintenance or repair. Field service and dispatch applications have become mission critical tools that affect a company's ability to deliver effective customer service and contain costs. The field service application provides the organization with features for scheduling and dispatching repair personnel, managing inventory and logistics, and handling contracts and accounting.

Retention Management

Effective CRM must be based on differentiating customers based on account and transaction histories. Today, very few organizations are able to make these distinctions. The ability to effectively segment customers depends on the decision support technology, which most executives see as a powerful enabler of CRM.

Effective decision support depends on the ability to gather customer information at great levels of detail. Detailed knowledge about customers allows companies to treat all customers individually and, in many cases, disengage from customers are high maintenance, low-margin prospects.

ERP:

ERP system integrates processes across all the departments and divisions of your company. As information is changed within one business application, other related functions and applications are automatically updated, streamlining the entire business process. ERP systems have helped firms reduce inventories, shorten cycle times, lower costs, and improve overall supply chain management practices

Once the sole domain of manufacturing industries, ERP implementations have branched out to non-traditional areas such as healthcare, the coffee industry, and even higher education. In fact, many e-businesses are discovering the value of having consistent, up-to-date data across the enterprise.

ERP also supports companies operating multiple sites around the world, global sourcing for parts and services, international distribution and different metrics for measuring performance around

the globe. For instance, a company's U.S. sales office may be responsible for marketing, selling and servicing a product assembled in the U.K. using parts manufactured in Germany and Singapore. ERP enables the company to understand and manage the demand placed on the plant in Germany. It allows the company to determine which metrics are best suited to measuring efficiency in a global economy with localized distribution, production and service operations.

ERP system can be seen as an automated record keeper or spreadsheet that can tally up company resources-such as raw materials and production capacity-and commitments, such as orders, regardless of whether the data is inputted through an accounting, manufacturing, or materials management system. ERP software accomplishes this task by digitally recording every business transaction a company makes, from the issuance of a purchase order to the consumption of inventory, and continually updating all connected systems to reflect each transaction.

This integrated approach provides all users, from company CEO to buyer at a remote plant, with a single, real-time view of their company's available resources and commitments to customers. For example, if a salesman logs a new order into his laptop computer on the road, the transaction flows through the company, alerting the procurement system that parts need to be ordered and telling the manufacturing system to reserve a spot in the production queue for the newly ordered product.

ERP Application Suite

Service delivery excellence requires placing the entire organization into a unified transaction environment. This strategy implies having one common platform instead of many platforms that may not be compatible with each other. ERP packages integrate logistics, manufacturing, financial and human resource/payroll management functions within a company to enable enterprise-wide management of resources. Such functions include the following:

ERP packages integrate logistics, manufacturing, financial and human resource/payroll management functions within a company to enable enterprise-wide management of resources. Such functions include (but are not limited to) the following:

Financial: general ledger, account receivable/payable, cost management;

Manufacturing: sales order entry, invoicing, capacity planning; and

Human Resources/Payroll: payroll, personnel management.

7.2 Consumer Behavior Models

- They attempt to predict/explain what consumers purchase and where, when, how much and why they buy.
- Consumer behavior models based on background demographic factors and other intervening, more immediate variables.

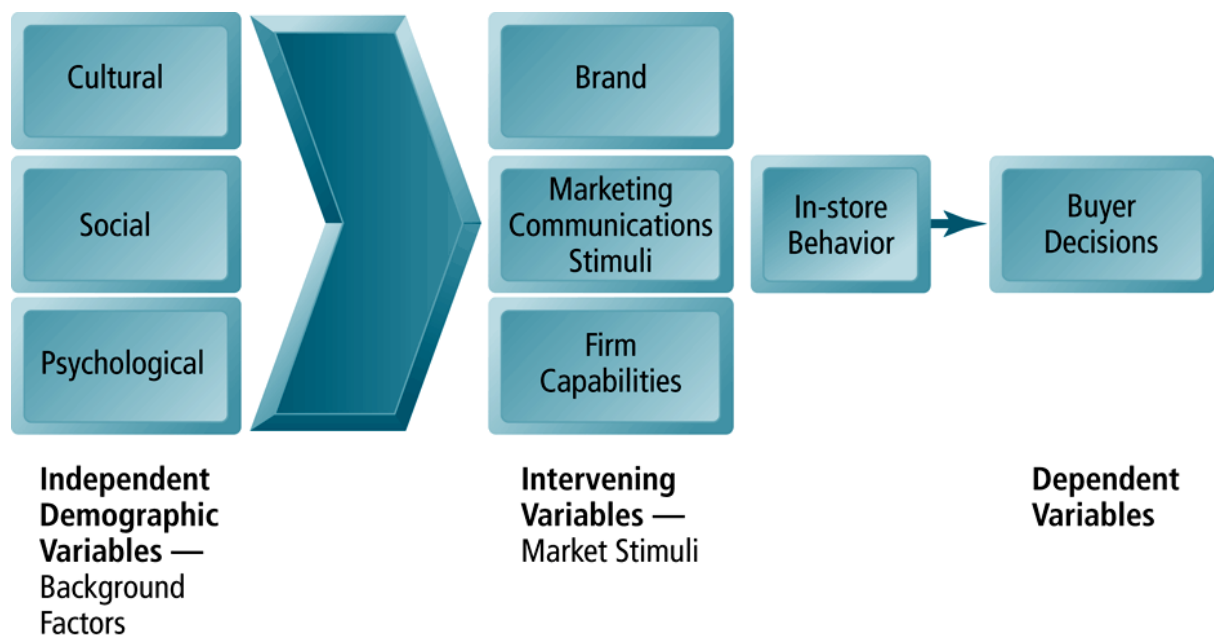


Figure 7.1-- A General Model of Consumer Behavior

Background Demographic Factors:

- Culture: Shapes basic human values, wants perceptions and behaviors
- Subculture: Subset of culture; forms around major social differences such as ethnicity, age, lifestyle, geography
- Direct reference group: Include one's family, profession/occupation, religion, neighborhood, schools
- Indirect reference group: Includes one's life-cycle state, social class and lifestyle group

- Opinion leaders (viral influencers): Influence the behavior of others through their personality, skills or other factors
- Psychological profile: set of needs, drives, motivations, perceptions and learned behaviors
- Psychographic profiles: divides market into different groups based on demographic and psychological data

7.3 Basic Marketing Concepts

- Marketing: The strategies and actions firms take to establish a relationship with a consumer and encourage purchases of products and services.
- Internet marketing: Using the Web, as well as traditional channels, to develop a positive, long-term relationship with customers, thereby creating competitive advantage for the firm by allowing it to charge a higher price for products or services than its competitors can charge.

Feature Sets:

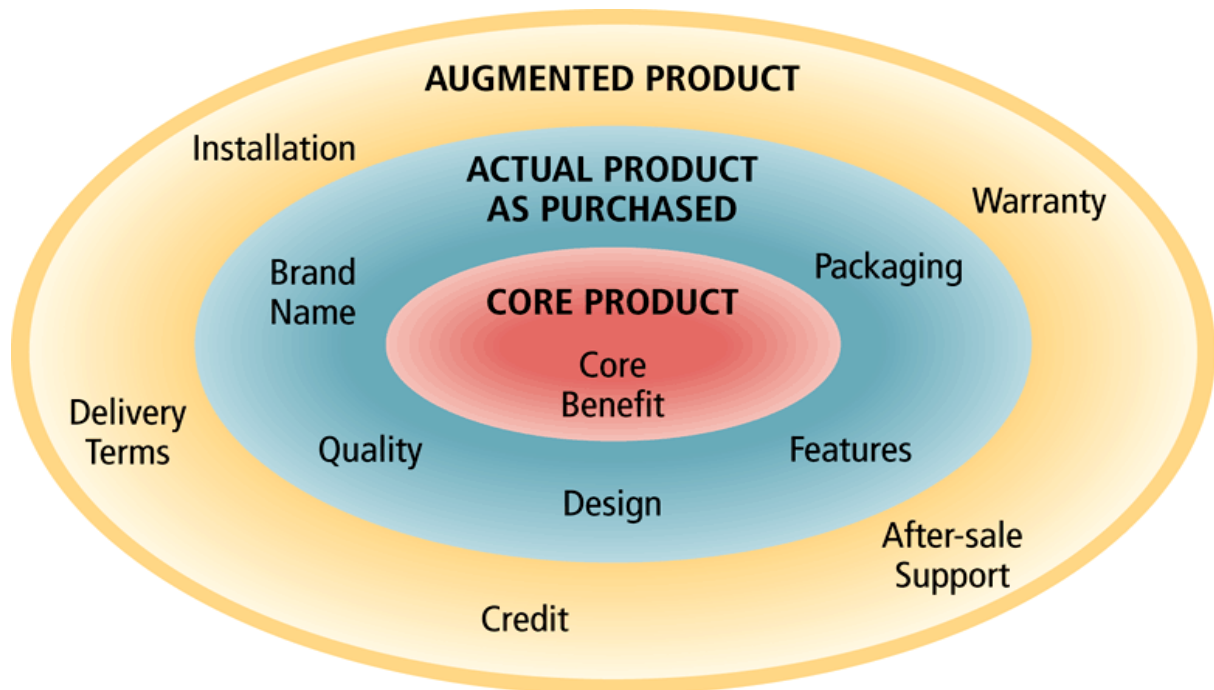
- Defines as the bundle of capabilities and services offered by the product or service
- Includes:
 - Core product – the core benefit the customer receives from the product.
 - Actual product – the set of characteristics designed to deliver the product's core benefits.
 - Augmented product – a product with additional benefits to customers beyond the core benefits embodied in the actual product.

7.4 Internet Marketing Technologies

- Web transaction logs
- Cookies and Web bugs
- Databases, data warehouses, and data mining

- Advertising networks
- Customer relationship management (CRM) systems

Feature Set (figure)



Web Transaction Logs:

- Built into Web server software
- Records user activity at a Web site
- Web Trends a leading log analysis tool
- Can provide treasure trove of marketing information, particularly when combined with:
 - Registration forms – used to gather personal data
 - Shopping cart database – captures all item selection, purchase and payment data

Cookies:

- Cookies: small text files that Web sites place on a visitor's client computer every time they visit, and during the visit as specific pages are accessed.
- Cookies provide Web marketers with a very quick means of identifying the customer and understanding his or her prior behavior
- Location of cookie files on computer depends on browser version

Web Bugs:

- Tiny (1 pixel) graphic files embedded in e-mail messages and on Web sites.
- Used to automatically transmit information about the user and the page being viewed to a monitoring server.

Databases and Data Warehouses:

- Database: Software that stores records and attributes
- Database management system (DBMS): Software used to create, maintain and access databases
- SQL (Structured Query Language): Industry-standard database query and manipulation language used in a relational databases
- Relational database: Represents data as two-dimensional tables with records organized in rows and attributes in columns; data within different tables can be flexibly related as long as the tables share a common data element
- Data warehouse: Database that collects a firm's transactional and customer data in a single location for offline analysis by marketers and site managers

Data Mining:

- Set of analytical techniques that look for patterns in data of a database or data warehouse, or seek to model the behavior of customers
- Types include:
 - Query-driven – based on specific queries

- Model-driven – involves use of a model that analyzes key variables of interest to decision makers
- Rule-based – examines demographic and transactional data of groups and individuals at a Web site and attempts to derive general rules of behavior for visitors
- Collaborative filtering – behavioral approach; site visitors classify themselves into affinity groups based on common interests; products are then recommended based on what other people in the group have recently purchased

Advertising Networks:

- Best known for ability to present users with banner advertisements based on a database of user behavioral data
- DoubleClick best-known example
- Ad server selects appropriate banner ad based on cookies, Web bugs, backend user profile databases

Customer Relationship Management (CRM) Systems:

- Repository of customer information that records all of the contacts that a customer has with a firm and generates a customer profile available to everyone in the firm with an need to “know the customer”
- Customer profiles can contain:
 - Map of the customer’s relationship with the firm
 - Product and usage summary data
 - Demographic and psychographic data
 - Profitability measures
 - Contact history
 - Marketing and sales information

7.5 Market Entry Strategies

- **Permission marketing:** Marketing strategy in which companies obtain permission from consumers before sending them information or promotional messages (example: opt-in e-mail)
- **Affiliate marketing:** Marketing strategy that relies on referrals; Web site agrees to pay another Web site a commission for new business opportunities it refers to the site
- **Viral marketing:** Process of getting customers to pass along a company's marketing message to friends, family, and colleagues
- **Brand leveraging:** Process of using power of an existing brand to acquire new customers for a new product or service.
- **One-to-one marketing:** Involves segmenting the market on a precise and timely understanding of an individual's needs, targeting specific marketing messages to these individuals and then positioning the product vis-à-vis competitors to be truly unique
- **Customization:** Changing the product (not just the marketing message) according to user preferences
- **Customer co-production:** Allows the customer to interactively create the product
- **Transactive content:** Results from the combination of traditional content with dynamic information tailored to each user's profile
- **Customer service tools which include:**

Frequently asked questions (FAQs) – text-based listing of common questions and answers

Real-time customer service chat systems – company's service representatives interactively exchange text messages with one or more customers on a real-time basis

Intelligent agent technology – bots

Automated response systems – send e-mail confirmations and acknowledgments

7.6 Net Pricing Strategies

- Pricing (putting a value on goods and services) an integral part of marketing strategy
- Traditionally, prices based on:
 - Fixed cost (costs of building production facility)
 - Variable costs (costs involved in running production facility)
 - Market's demand curve (quantity of goods that can be sold at various prices)
- Price discrimination: Selling products to different people and groups based on their willingness to pay
- Free products/services: Can be used to build market awareness
- Versioning: Creating multiple versions of a good and selling essentially the same product to different market segments at different prices
- Bundling: Offers consumers two or more goods for one price
- Dynamic pricing:
 - Auctions – establish an instant market price for goods
 - Yield management – Managers set prices in different markets, appealing to different segments in order to sell excess capacity

7.7 Online Advertising

There are a number of different forms of online advertising:-

- **Banner and rich media ads:-** they are promotional messages that user can respond to by clicking on the banner and following the link to a product description or offering.
- **Interstitial ads:-** it is a way of placing full page messages between the current and destination pages of a user.
- **Superstitials ads:-** these are rich media ads developed by unicast that pre-load into a browser's cache and don't play until fully loaded and the user clicks to another page.

- **Paid search engine inclusion and placement:-** it is a relatively recent phenomenon. Firms now pay search engines for inclusion in the search engine index, receiving a guarantee that their firm will appear in the results of relevant searches.
- **Sponsorships:-** these are paid efforts to tie an advertiser's name to a particular information, an event, or a venue in a way that reinforces its brand in a positive manner.
- **Affiliate relationships:-** it permit a firm to put its logo or banner ad on another firm's website from which users of that site can click through to affiliate's site.
- **Direct e-mail marketing:-** it sends email directly to interested users.
- **Online catalogs:-** these are the online equivalent of paper based catalogs. Their basic function is to display an e-commerce merchant's wares.
- **Public relations:-** it involves pursuing media coverage and exposure to target audiences without buying advertising space.

7.8 Main ethical, social, and political issues

The major issues raised by e-commerce can be loosely categorized into four major dimensions:-

- ❖ **Information rights:-** what rights do individuals have to control their own personal information when internet technologies make information collection so pervasive and efficient?
- ❖ **Property rights:-** how can traditional intellectual property rights be enforced when perfect copies of protected works can be made and easily distributed worldwide via the internet?
- ❖ **Governance:-** should the internet and e-commerce be subject to public laws? If so, what law-making bodies have jurisdiction- state, federal, and/or international?
- ❖ **Public safety and welfare:-** what efforts should be undertaken to ensure equitable access to the internet and e-commerce channels? Do certain online content and activities pose a threat to public safety and welfare?

7.9 Basic concepts related to privacy

- **Privacy:-** it is the moral right of individuals to be left alone, free from surveillance or interference from others

- **Information privacy:-** it includes both the claim that certain information should not be collected at all by governments and business firms, and the claim of individuals to control the use of information about themselves.
- **Due process:-** due process as embodied by the fair information practices doctrine, informed consent, and opt-in/opt-out policies also play an important role in privacy.

7.10 Methods to protect privacy

There are a number of different methods used to protect privacy. They include:

- ☞ **Legal protections:-** legal protections deriving from constitutions, common laws, state laws, and government regulations.
- ☞ **Industry self regulations:-** via industry alliances such as the online privacy alliance and the network advertising initiative that seek to gain voluntary adherence to industry privacy guidelines and safe harbors. Some firms also hire chief privacy officer.
- ☞ **Privacy enhancing technological solutions:-** it includes secure email, anonymous remailers, anonymous surfing, cookie managers, disk file erasing programs, policy generators, and privacy policy readers.

7.11 Various Forms of Intellectual Property And Challenge of Protecting

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There are three main types of intellectual property protection:

- 🖨 **Copyright law:-** It protects original forms of expression (but not ideas) from being copied by others for a period of time.

Look and feel copyright infringement lawsuits involve distinction between an idea and its expression.

Fair use doctrine: Under certain circumstances, permits use of copyrighted materials without permission.

Digital Millennium Copyright Act of 1998 (DMCA): First major effort to adjust copyright laws to Internet age.

- 🖨 **Patent law:-** It grants owner a 20-year exclusive monopoly on ideas behind an invention.

Most of early inventions that made Internet and e-commerce possible were not patented by their inventors.

With commercial development of Internet, came desire for patents.

Business methods patents have been widely sought by Internet and e-commerce companies.

 **Trademark protections:-** Trademark: Mark used to identify and distinguish goods, and indicate their source.

Trademarks protect public by ensuring it gets what it pays for/expects to receive; protects trademark owner against piracy and misappropriation.

Infringement: Use of a trademark that creates confusion with existing marks, causes consumers to make market mistakes or misrepresents origins of goods.

Anticybersquatting Consumer Protection Act (ACPA): Creates civil liabilities for anyone who attempts in bad faith to profit from an existing famous or distinctive trademark by registering an Internet domain name that is identical or confusingly similar.

7.12 Major Public Safety and Welfare issues

It includes:

■ **Protection of children and strong sentiments against pornography**

- Passing legislation that will survive court challenges has proved difficult:

Communications Decency Act struck down

Children's Online Protection Act struck down (but still be considered by lower courts)

Children's Internet Protection Act upheld by Supreme Court (requires schools and libraries to install technology protection measures)

■ **Efforts to control gambling and restrict sales of drugs and cigarettes**