

## Chapter 2

# Basic Technology of the Internet and e-Commerce Businesses

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### Acknowledgment

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### Early network

- Internet's beginnings can be traced back to memos written in 1962 by MIT's Joseph Carl Robnett Licklider outlining the galactic networking concept
- Great advances were made in network technology in 1960s
- To connect computers and permit transfer of information locally, many organizations installed Local Area Networks
- LAN technology was limited by geographical distance

To allow computer and networks separated by larger geographical distance to communicate ARPA (Advanced Research Projects Agency) developed a Wide Area Network (WAN) called the ARPANET

### What Is the Internet?

- Internet Protocol (IP):
  - Software that sets the rules for data transfer over a network (from a network to another network)

- Transmission Control Protocol (TCP):
  - Software that ensures the safe and reliable transfer of the data
    - Reliable refers to: (1) complete arrival of data to destination, (2) ensuring data segments are ordered, (3) ensuring that the contents have not changed.
- The internet is a collection of wires, protocols and hardware that allows the electronic transmission of data over TCP/IP
- Any data can be transferred over the net, e.g., email, faxes ,video ,voice & web pages
- Technically www (web) and the Internet are not the same. The web is an application for the Internet

### How the internet works?

Characteristics that allow shared access of data in a network:

1. Unique identification of each computer on the network  
*Internet is a network of millions of computers and thousands of networks intertwined together. Thus it was important that each computer can be uniquely identified by assigning a specific Internet Protocol (IP) address.*  
*e.g., 198.108.95.145*
2. Human-friendly addressing  
*Domain Name System (DNS) gave each computer on the network an address comprising of an easily recognizable letters and words instead of an IP address which is difficult to memorize.*  
*e.g., www.philanthropy.com*
3. Packet Switching  
*To remedy delays associated with unequally sized data transfers, instead of transferring files in their entirety, whole files are broken up into data packets before being transferred over the network. Each packet may take a different path on the packet switched network.*
4. Routing  
*Routers are dedicated, special-purpose computers which serve as an intermediary between networks. They route packets efficiently through networks. Routers are building blocks of the internet. On the Internet, routers must use the Internet protocol (IP). On other networks, different routing protocol might be used*
5. Reliability and Transmission control Protocol  
*IP software handles packet deliveries and TCP handles safe and reliable delivery of packets. See above the meaning of reliable transmission.*
6. Standardization  
*Without the TCP/IP standardization, there would have been many negative tradeoffs, such as inflexibility and increased functional and switching costs. That is converting between different sets of protocols would make the Internet cost more. In general standardization leads to two advantages: (1) more competition and hence*

higher quality and lower prices, and (2) interoperability; i.e, the ability of different systems to work together.

### How are Web Sites Created?

A Web page can be made by adding text-based codes called Hyper Text Markup Language (HTML) to a text file. There are four approaches to creating Web pages:

1. *Text editor* allows creating Web Pages and gives more flexibility and control over design and layout.
2. *Document conversion* tools enable existing documents and new documents to be created and posted with minimal investment in learning markup language.
3. *Web authoring tools* such as Microsoft FrontPage let users add multimedia objects such as sound and animation to their web pages.
4. *High-end Web authoring tools* such as Dream weaver and Adobe Go Live offer more powerful site creation and management features, and allow expanded features such as database integration to be built in a web site.

### What Web pages are made of?

- The entire Web is built upon three concepts: web pages (documents seen on the browser), links (connecting one web page to another), and servers (storing and transmitting the information to the browsers for display)
- No special software is required to create a web page
- Majority of pages are created using Hyper Text Markup Language(HTML)
- WYSIWYG (What You See Is What You Get) Allow the user to create a web page in the exact look that s/he wants without dealing with tags and coding.  
Ex: Microsoft FrontPage.

### Contents of the Web

- Links
  - Internal Anchor Links:  
*Internal anchors are used to connect with other locations within the same document.*
  - Page Links:  
*Page links allow users to link to other web pages.*
  - Mail-to Links:  
*Mail links are used to let users send feedback and questions directly to them.*
- Forms  
*Forms are basically web pages where the user can enter information on the fields provided on the page. Forms are useful in getting highly structured feedback.*
- Images

*The most supported image formats on the Web are Graphic Image Format (GIF) and Joint Picture Encoding Group (JPEG).*

- Multimedia

*Web supports multimedia file type such as images, audio and video.*

### Capturing content

- Print Images

*Printed images can be captured with low cost scanners and photos can be downloaded with digital video cameras.*

- Audio

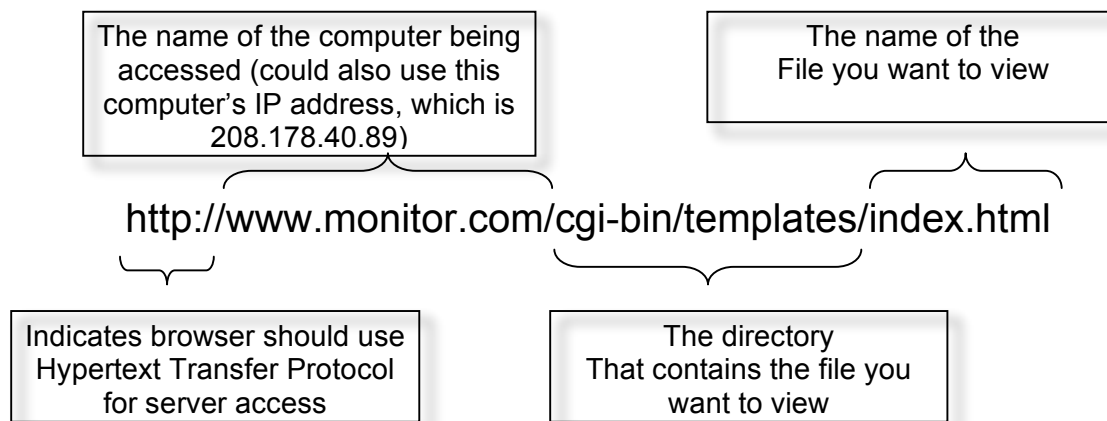
*Sounds can be captured, compressed and stored for use on the web.*

- Video

*Video capture cards allow users to capture the analog video output of camcorders, VCRs and DVD players.*

### Web Browsers

- Browsers make the retrieval process transparent
- Uniform Resource Locator (URL): Tells the browser several things about how to access the desired content:
  1. The transmission protocol to access the content. e.g., Hyper Text Transfer Protocol for Web Pages, File Transfer Protocol (FTP) for transmission of files, and the extended S-HTTP for a higher degree of security.
  2. The name of the computer where the content can be found
  3. The directory on the computer where content is stored.
  4. The name of the file containing the content



### Doing business on the Internet

E-commerce is playing an increasingly important role in the lives of consumers. There are six components of running an e-commerce store

1. Placement
2. Store size
3. Presentation

4. *Payment*
5. *security*
6. *Fulfillment.*

## Placement

### Bricks-and-Mortar

#### Location

- When deciding on a store location, a company must consider many factors, including geographic desirability, the other nearby store, the number of customers the store must accommodate.
- A store's location has a large effect on the number of customers and the type of customers who will flow into the store, for example: a store in busy mall will likely have more traffic than a stand-alone store.
- A few customers who can afford and appreciate are better than many customers who cannot afford anything in the store.

#### Competition

*When choosing a location, merchants prefer to set up stores where there is little competition for customers*

#### Convenience

*In addition to considering convenience for customers, merchants also consider how convenient a location is for themselves.*

### E-commerce

#### Location

- placement is also an important issue when starting an online store so while physical location of an online business 's headquarters is to little concern to the consumer ,it is important that the web site is highly visible and easily found.
- An e-commerce store on yahoo shopping could expect that it would receive some of yahoo's traffic, as with physical store, it is more important to attract traffic from people who are potential customers.
- Unlike a physical location, a website can be found in many different "places" on the internet, web sites can be found through their domain name.
- companies that do not own the domain name for their industry can still benefits from the domain name as in the case with Monster.com which has a link to its website on *www.jobs.com*

#### Competition

- *The location and visibility of competitive websites is a factor is deciding the location of an e-commerce location*

#### Convenience

- *Some e-commerce locations offer more convenience to the merchant than others, sites like Amazon zShops and Yahoo function as large online malls*

## Store Size

### Bricks-and-Mortar

- Some *types of products* require a large store than others; a store selling furniture would need a larger showroom floor than a card shop. Also stores that expect *heavy traffic* need to choose a location with adequate parking and entrances and walkways large enough to accommodate such traffic.

### E-commerce

- Manager must evaluate how large a store must be accommodate its customers and products .Store that expect a lot of traffic need to be designed to handle that traffic
- While physical stores must have adequate number of parking spaces and wide enough aisles and entrances. E-commerce stores need enough *bandwidth*, *processing power* and *data capacity*.

*Bandwidth*: Is the amount of data that can be sent through a connection at once.

*Processing Power*: Is the amount of data that can be processed by a website at a given time. Three factors influence the amount of processing power needed

- Product breath
- Number of transactions
- Level of interactivity

*Data Storage Capacity*:

Online businesses collect and store huge amounts of customer data such as demographics, purchase patterns, billing histories, and click streams

## Presentation

### Bricks-and-Mortar

- Store lay out: often speaks volumes about the image a store wishes to project and the type of customers it wishes to retain. So, marketers and merchants pay great attention to how their merchandise is presented
- Customer services: is a necessity for a successful merchant and it defines a customer 's experience and is a leading driver of customer retention ,great customer services also often enables merchants to charge premiums for their products.

### E-commerce

- Store lay out: can help e-commerce stores draw and retain customers.
- User interface: an appropriate user interface should be represented of the store's theme, easy to navigate and pleasing to the store's customers.
  - With bricks-and-mortar stores, merchants can be certain that the store lay out he or she designs and implements will be followed accurately. However, in online store you need to ensure your customers see what you want them to see.

- Know your customers: the user interface should be designed both aesthetically and functionally for the optimum customer experience for the company's target customers
- Online customer service: Customer services in e-commerce lack direct interaction between the customer and the purchasing environment.
  - *The web:* although web pages can be an effective means of customer's services, it is important to note that the information contained on them is rarely comprehensive and often not suitable for customers requiring specific information. Bricks-and-mortar stores that have an online presence often use their websites for common questions such as nearest store location, hours, directions and return policy.
  - *E-mail:* to allow e-mail inquiries to be sent directly to customer services representation, in the most cases e-mail is the most efficient than a phone-based customer services call center. Customers must wait for response and trust that the company will respond quickly.
  - *Chat:* a potential solution to the lack of real-time.
  - *Discussion groups:* are a low-cost form of customer services, it helps customers interact in a way that allows them to help each other.

## Payment

### Bricks-and-Mortar

Customers pay in a variety of methods, including cash, personal checks, traveler's checks, debit cards, credit cards, coupons and gift certificates. Each one of these payment types has distinct characteristics and managers must carefully determine which types of payment to accept.

### Cash

Is the most popular form of payment in the Bricks-and-Mortar world. Virtually all offline stores accept cash. However, cash has two issues:

- *Theft* the most pressing issue for the managers whose business accepts cash as payment is theft, for example: a customer could pay for an item with exact change and not ask for receipts. With no record of sale, the clerk could very easily pocket the customer's money.
- *Cash fees*

### Credit cards

Are another popular form of payment at Bricks-and-Mortar stores. Besides being convenient, they allow consumers to extend their purchasing power. As a result, these cards are often used for larger purchases. They have the following issues:

- *Fraud.* Theft is also an issue with credit card payment. For example, fraud occurs when someone purchases something with a card that does not belong to him. This can occur when the merchant does not request proper identification or check the back of the card for signature match.
- *Fees.* In return for their services, credit card companies charge transaction fees to participating merchants. Fees are a per-transaction charge plus a small percentage of the purchase price. In addition to transaction fees, merchants often have to spend money to lease or buy the equipment necessary to accept credit card payment. It reads the magnetic strip on the back of a card, dials into an acquiring bank for validation and prints credit card receipts.

### E-commerce

The main difference between e-commerce and Bricks-and-Mortar payment methods can be seen when evaluating the natures of the two media. Bricks-and-Mortar implies the physical, while e-commerce implies the virtual. Therefore, such an electronic medium prohibits the use of cash and encourages transactions that do not require physical funds but instead involve only data transfer.

#### Cashless Society

If any e-commerce stores accept cash as method of payment, many do however accept personal checks, cashier's checks and money orders. Because these forms of payment are traceable, they are generally considered safer from theft than cash.

#### Credit cards

Are the dominant form of payment on the web. Their electronic nature allows customers and e-commerce stores to pay and receive payment immediately. While check and money order payments might take days to complete, credit card payment takes only seconds.

- *Card-not-present transactions*, the credit card is physical present. While in an online transaction the card is not physical present. It often refers to online credit transactions as card-not-present transactions. When fraud occurs online, e-commerce merchants are often helpless to protect themselves. Because the card was not physically present during the transaction.
- *Higher fraud rates*: given the virtual nature of e-commerce transactions, credit cards fraud is much more prevalent online than offline.
- *Higher fees*: online merchants must also cope with higher credit card fees because credit card fees vary according to merchant's risk category.
- *Security*: given the increased opportunity for credit card fraud on the web, security is an important component of enabling credit transactions; merchants must address three primary aspects of credit card security: (1) the transfer of data from the customer's computer to the merchant's e-commerce store, (2) The transfer of data from the merchants to the payment processors, (2) and the protection of customer data stored in the merchant's database. The first two issues concern data transfer on the internet and are addressed with the use of secure protocols (https). The third one is typically addressed by encrypting the customer data in the database.

### Security

The goal is keeping assets secure. It is an important issue for merchants as long as the business exists. As size of the e-commerce business increases, threats increase because of the economic of scale that the e-commerce's merchants enjoy, the world wide hackers also enjoy.

- Hackers: people who have an unprecedented ability to steal money from e-commerce customers.

As e-commerce become a part of our daily life, keeping stores secured in an important and increasing battle facing the business, so security technology should increase to cope this battle.

## Bricks-and-Mortar

Physical security or offline security as physical security of inventory, cash and records are important so security technology must include overt and covert cameras, alarms, security tags, security guards.

### Overt and cameras

- Example: management should install cameras in locations where aesthetics aren't an issue

### Alarms and security tags

- Using alarms to monitor entry and exit activity during off-hours to reduce robbery.

### Security guards

- Security personal monitors both in-store activity and off-hours activity guards can be informed or undercover.

## E-commerce

E-commerce is much complicated than offline commerce because of several factors such as:

### Technology complexity:

- as selling products on the web is so dependent on technology .significant technology expertise is required to secure an e-commerce site

### Many more potential attackers

- E-commerce is usually through a world wide accessed web site for customers, this allows hackers and criminal's attacks business which is difficult to avoid or prosecute.

### Much more potential damage

- As we said that the e-commerce web site is more potential attacked. The crimes that could be committed or damage on the site data base.
- Example: cyber criminals may access the site database and access the customer's account and simply modify their accounts or make the web site nonfunctional.

## E-commerce security technology

Due to the previous threats and the high degree of openness of many networks .New technology and systems needed to provide more secured transaction environment such as:

### a) Passwords:

- The advantages of using passwords are
  - Customers can access confidential account information.
  - Customer isn't required to retype his information for every order.
- The disadvantage of using passwords are:
  - People aren't always diligent to keep their passwords secret
  - Many websites don't encrypt login information which allows cyber criminal to steal the user password by using special software.

### b) Encryption

As much personal information are traded between the users and the site across the Internet during the transaction. We need to ensure that this information is kept secured during the communication.

- Encryption technology: encoding and decoding information transmitted over the internet .so only the sender and the intended receipts can read the information by using specific software.
- We design powerful encryption software using complex mathematical formulas.
- How to use encryption?
  - o Simply by installing the required encryption software on both the sending and receiving computers. The message in the sending software encodes to be sent via the internet and when it reaches to the receivers software it decoded a gain to be readable by the receivers, so no one can read the message unless the one who have the encryption software.
  - o It is the mostly suitable for the people who placing orders online .ex: SSL

#### c) Public key infrastructure

- It is an additional piece of software in the encryption software that ban third party to use stolen encryption software to decrypt stolen piece of information during the transmission from the sender to the receiver.
- It usually required protecting sensitive data of the customers.
- How the key infrastructure works???

### **Fulfillment**

Even that it is the most important components of e-commerce, most companies give it the least priority in terms of money spending.

- It includes multiple activities such as processing, packaging, delivering and customer services that enable merchants to adequately complete the customer orders.

#### Bricks-and-Mortar

- Can take many forms depending on the type of business but according to Bricks-and-Mortar it includes the necessary steps to distribute the products to the customer.

#### E-commerce

- E-commerce fulfillment similar to the offline fulfillment in that they both have the same challenges to deliver orders to millions of customer at the minimum delivery and shipping costs.
- E-commerce items shipped and packed one by one to the customer instead of bulk-shipping to the distribution channels.

Major issues facing merchants as they consider e-commerce fulfillment are:

- a) *Customer demand for transparency*: the web provides customers with an easy interface to collect and track information about purchases such as order status and delivery tracking.

- b) *Many activities and parties*: a key challenge for e-commerce fulfillment is handling the logistics of accommodating many activities and parties simultaneously. For shipping alone, an e-commerce merchant could use a variety of providers simultaneously.
- c) *Multiple systems*: in addition to keeping track of these multiple parties, an e-commerce merchant must also coordinate between different platforms and multiple computer systems.
- d) *Capacity utilization*. The