Chapter 2

Basic Technology of the Internet and e-Commerce Businesses

Copyright © 2004 by The McGraw-Hill Companies, Inc. All rights reserved.

Basic Technology of the Internet and e-Commerce Business

- What is the Internet?
- What four factors make the Internet easy to use?
- What are the content types on the Web?
- How are websites created?
- What are the key similarities and differences between e-commerce and bricks-and-mortar selling in regard to location?
- How does e-commerce payment differ from bricks-and-mortar payment?
- What role does security play in e-commerce?
- What challenges exist in e-commerce fulfillment?

What is the Internet?

- **Internet Protocol (IP):**
  - **Software that sets the rules for data transfer over a network**
- **Transmission Control Protocol (TCP):**
  - **Software that ensures the safe and reliable transfer of the data**

What is the Internet?

- 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 net are not the same.The web is an application for the net

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 an easily recognizable letters and words instead of an IP address.

   e.g., www.philanthropy.com

How the Internet Works (cont'd)

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.

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.

How the Internet Works (cont'd)

5. Reliability and Transmission control Protocol

IP software handles packet deliveries and TCP handles safe delivery of packages.

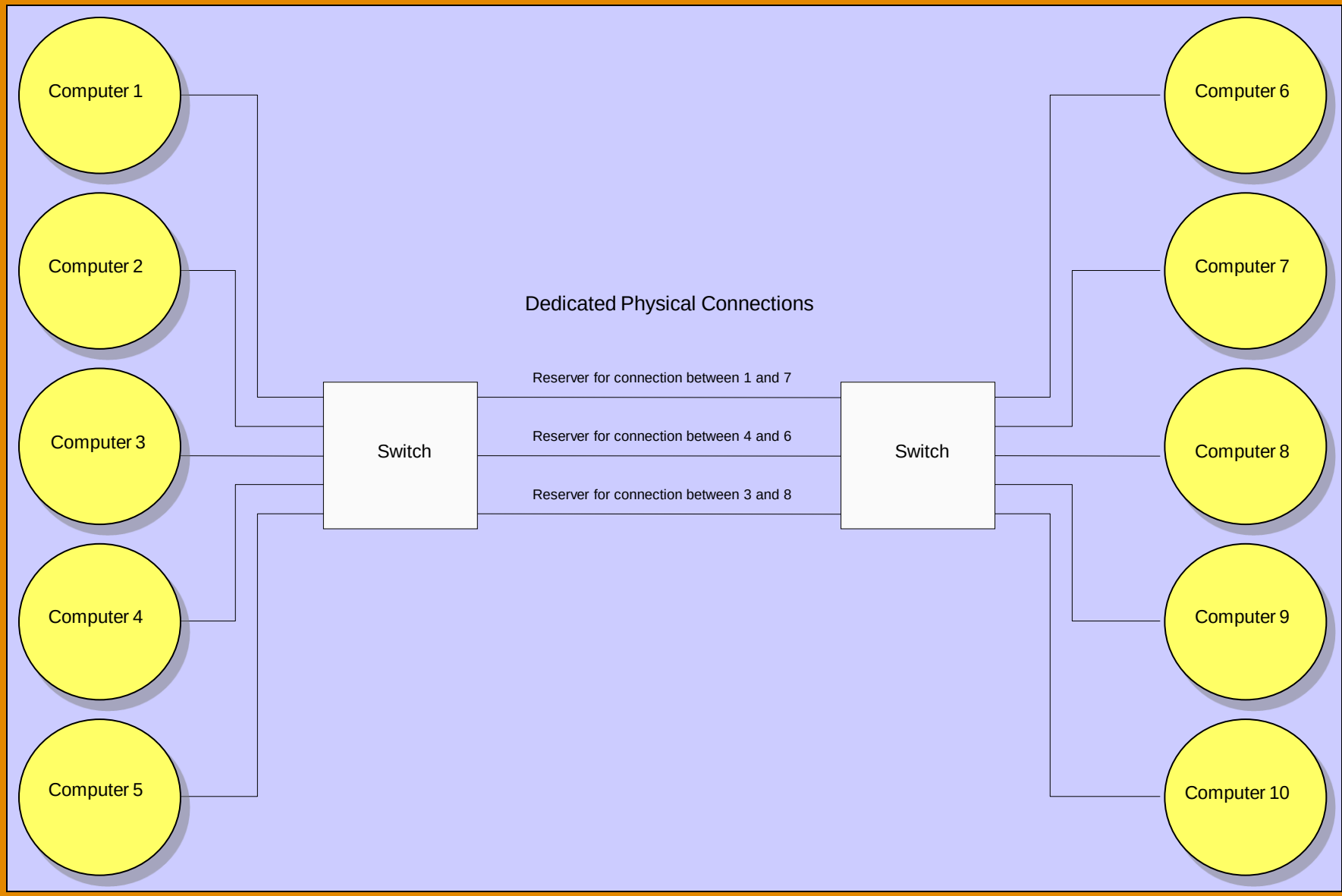
6. Standardization

Without the TCP/IP standardization, there would have been many negative tradeoffs, such as inflexibility and increased functional and switching costs.

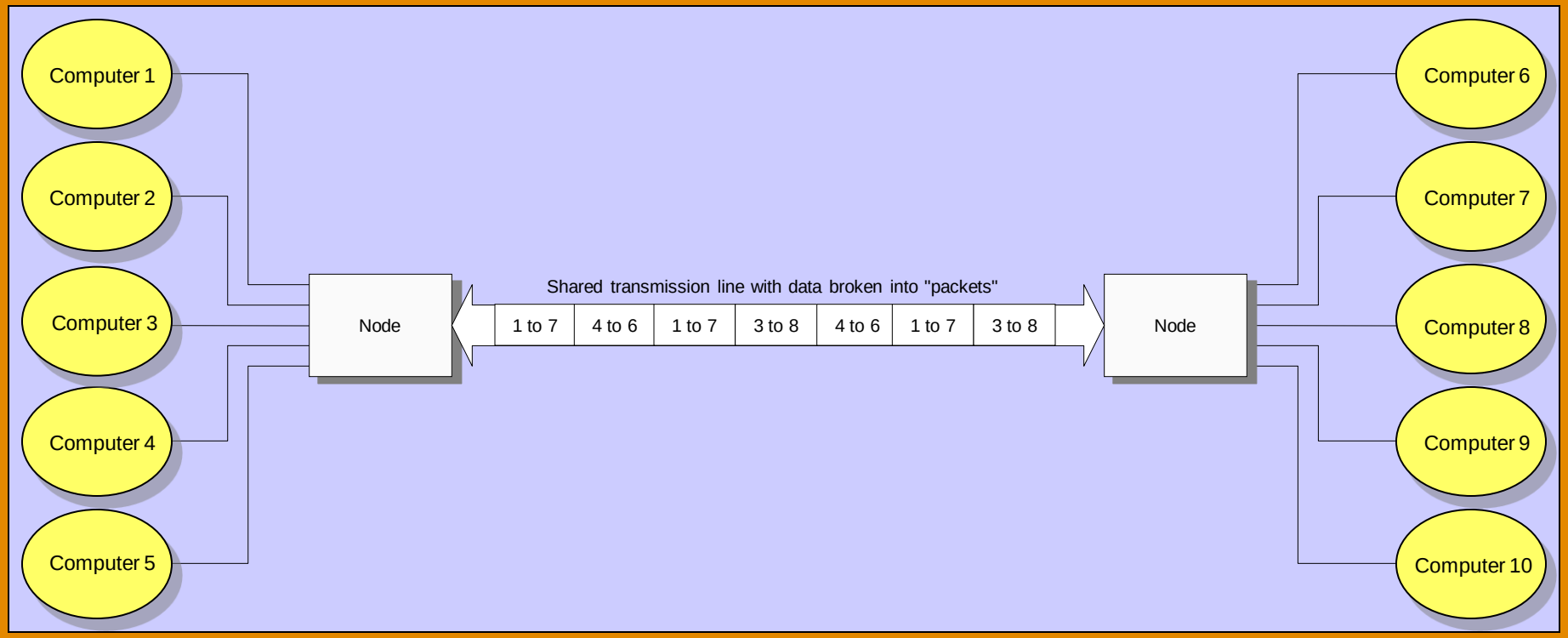
Functions of TCP/IP

- Prevents loss of data
- Checks packets
- Eliminates duplicate packets
- Sends confirmation when the packet is received
- If confirmation is not received, then the packet is retransmitted
- Enables reliable and error-free communication over the net

Circuit-Switched Network



Packet-Switched Network



Web Site Technologies

1. Web page is made by adding text-based codes called Hyper Text Markup Language (HTML) to a text file. Text editors allow creation of WebPages, giving 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, e.g., Microsoft FrontPage, let users add multimedia objects such as sound and animation to their web pages.
4. High-end Web authoring tools such as Dreamweaver and Adobe GoLive offer more powerful site creation and management features, and allow expanded features such as database integration to be built in a web site.

Browser View and Source View of a Web Page

This is my first web page.htm - Notepad

File Edit Search Help

```
<HTML>
<HEAD>
<META HTTP-EQUIV="Content-Type" CONTENT="text/html; charset=windows-1252">
<META NAME="Generator" CONTENT="Microsoft Word 97">
<TITLE>This is my first web page</TITLE>
</HEAD>
<BODY LINK="#0000ff">

<FONT FACE="Arial" SIZE=6><P>This is my first web page.</P>

<P>Here is an image: <IMG SRC="Image1.gif" WIDTH=207 HEIGHT=165></P>

<P>Here is a </FONT><A HREF="http://www.monitor.com/"><FONT FACE="Arial" SIZE=6>link</FONT></A></P>
<FONT FACE="Arial" SIZE=6>
<P> </P></FONT></BODY>
</HTML>
```

This is my first web page - Microsoft Internet Explorer provided by Monitor Company

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites History Mail

Address Go

This is my first web page.

Here is an image:

Here is a link

Done Local intranet

Essence of Web Pages

- **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)**

Contents of the Web

- Links
  - **Internal Anchor Links:**
  - **Page Links:**
  - **Mail-to Links:**

  .
- Forms
  - **Web pages where the user can enter information on the fields provided on the page.**
  - **Forms are useful in getting highly structured feedback.**

Contents of the Web (cont'd)

- Images

  The most common image formats on the Web

  - **Graphic Image Format (GIF)**
  - **Joint Picture Encoding Group (JPEG).**

- Multimedia

  Web supports transfer of multimedia file types such as images, audio and video.

  - **e.g., WAV and MPEG**

Web Browsers

- **Browsers make 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 and the name of the file containing the content.**

Components of a URL

The name of the computer being accessed (could also use this computer's IP address, which is 208.178.40.89)

The name of the file you want to view

http://www.monitor.com/cgi-bin/templates/index.html

Indicates browser should use HyperText Transfer Protocol for server access

The directory that contains the file you want to view

Source: Adapted from Douglas Comer, *The Internet Book*, 3rd. Ed. (New Jersey: Prentice Hall, 2000), 203.

Placement: Bricks-and-Mortar

- **Placement**
  - **When deciding on a store location, a company must consider many factors including:**
    - **Geographic desirability**
    - **Nearby stores**
    - **Number of customers accommodated**
    - **Attributes of the space itself**
- **Competition**
  - **When choosing a location typically set up store where there is less competition for customers**
- **Convenience**
  - **In addition to considering convenience for customers, merchants also consider how convenient a location is for themselves**

Placement: e-Commerce

- **Location**
  - It is important that the website is highly visible and easily found. Factors that facilitate this are:
    - Placement of links to the website
    - Multiple domain names
    - Partnerships with websites
    - Use of search engines
- **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, for instance sites like Amazon zShops and Yahoo function as large online malls

Merchandise and Audience Size: Bricks-and-Mortar

- **Store Size:**
  - **There are two issues related to size**
    - **What type of items the store sells—the size of the merchandise will influence the size of the store**
    - **The number of customers who will be shopping in the store at once—more customers per hour requires a larger space**

Merchandise and Audience Size: e-Commerce

- **Store Size**
  - **Just as Bricks-and-Mortar stores consider parking spaces, aisle width, etc., e-commerce stores need enough bandwidth, processing power, and data storage capacity to provide proper service to their customers**
    - ***Bandwidth:*** **The amount of data that can be sent through a connection at one time**
    - ***Processing Power:*** **Is the amount of data that can be processed by a website at a given time. Three factors influence processing power needed**
      - Product breatdh
      - 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 Layout**
  - **Layout says a lot about the image a store wishes to project and the type of customers it wishes to retain. Marketers and merchants pay great attention to how their merchandise is presented**
- **Customer Service**
  - **Customer service is a necessity for a successful merchant and great service often enables merchants to charge premiums for their products**

Presentation: e-Commerce

- **Store Layout**
  - **Online presentation encompasses all customer-facing aspects of the store.**
    - **User Interface**
      - **Ensure your customers see what you want them to see, the way you want them to see it.**
      - **This means you need to know your customer**
- **Online Customer service**
  - **The lack of direct interaction between customer and the purchasing environment is addressed using:**
    - **The Web and FAQs**
    - **E-mail**
    - **Chat**
    - **Discussion Groups**
    - **Call center**

Payment: Bricks-and-Mortar

- **Cash**
  - **Issues with cash:**
    - **Theft**
    - **Cash Fees**
- **Credit Cards**
  - **Issues with credit cards**
    - **Fraud**
    - **Fees**

Payment: e-Commerce

- **Cashless Society**
- **Credit Cards**
  - **Issues with credit cards**
    - **Card-Not-Present Transactions**
    - **Higher Fraud Rates**
    - **Higher Fees**
    - **Security**

Security: Bricks-and-Mortar

- **Overt and Covert Cameras**
  - To monitor both shoplifting and shrinkage
- **Alarms and Security Tags**
  - Stores can use alarms to monitor entry and exit activity during off-hours
  - Place security tags on high-value items
- **Security Guards**
  - To monitor both in-store activity and off-hours activity

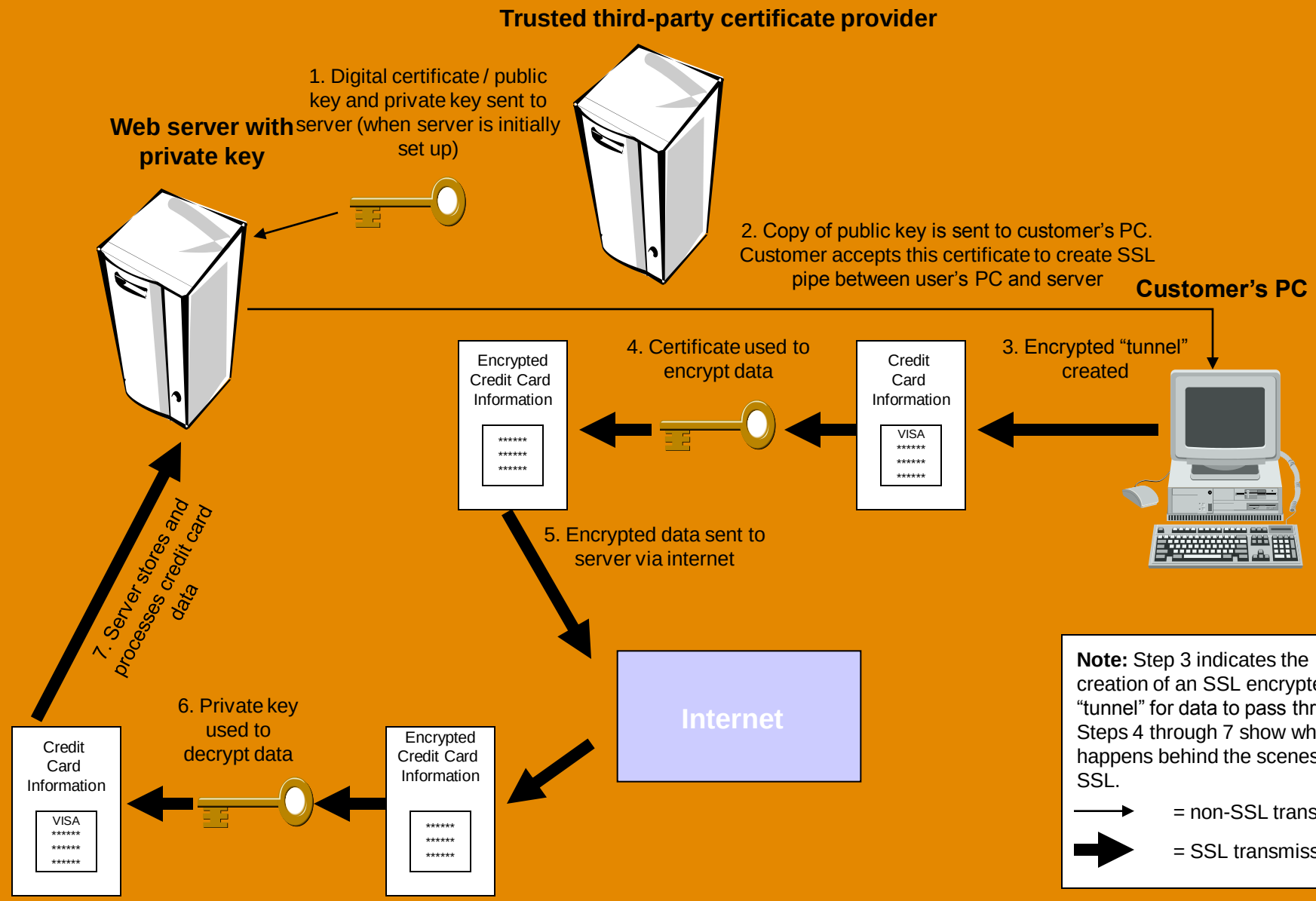
Security: e-Commerce

- **Technologically Complex**
  - Because selling products on the Web is so dependent on technology, significant technological expertise is required to secure an e-commerce site
- **Many More Potential Attackers**
  - Because the Internet allows a website to be accessed by a worldwide base of customers, it also allows it to be accessed by a worldwide base of hackers and criminals
- **Much More Potential Damage**
  - Because an e-commerce website is functionally the equivalent of a large single store, the scale of crimes is far larger than for any single outlet of a chain of physical stores

e-Commerce Security Technology

- **Several technologies can be employed to help reduce the risk to companies and their customers when completing e-commerce transactions**
  - ***Passwords:*** **Identify who is trying to access a website or part of a website**
  - ***Encryption:*** **Encodes and decodes information transmitted over the Internet**
  - ***Public Key Infrastructure:*** **Encryption software uses pieces of additional software called keys to ensure that only the creators and the intended recipients can access it**

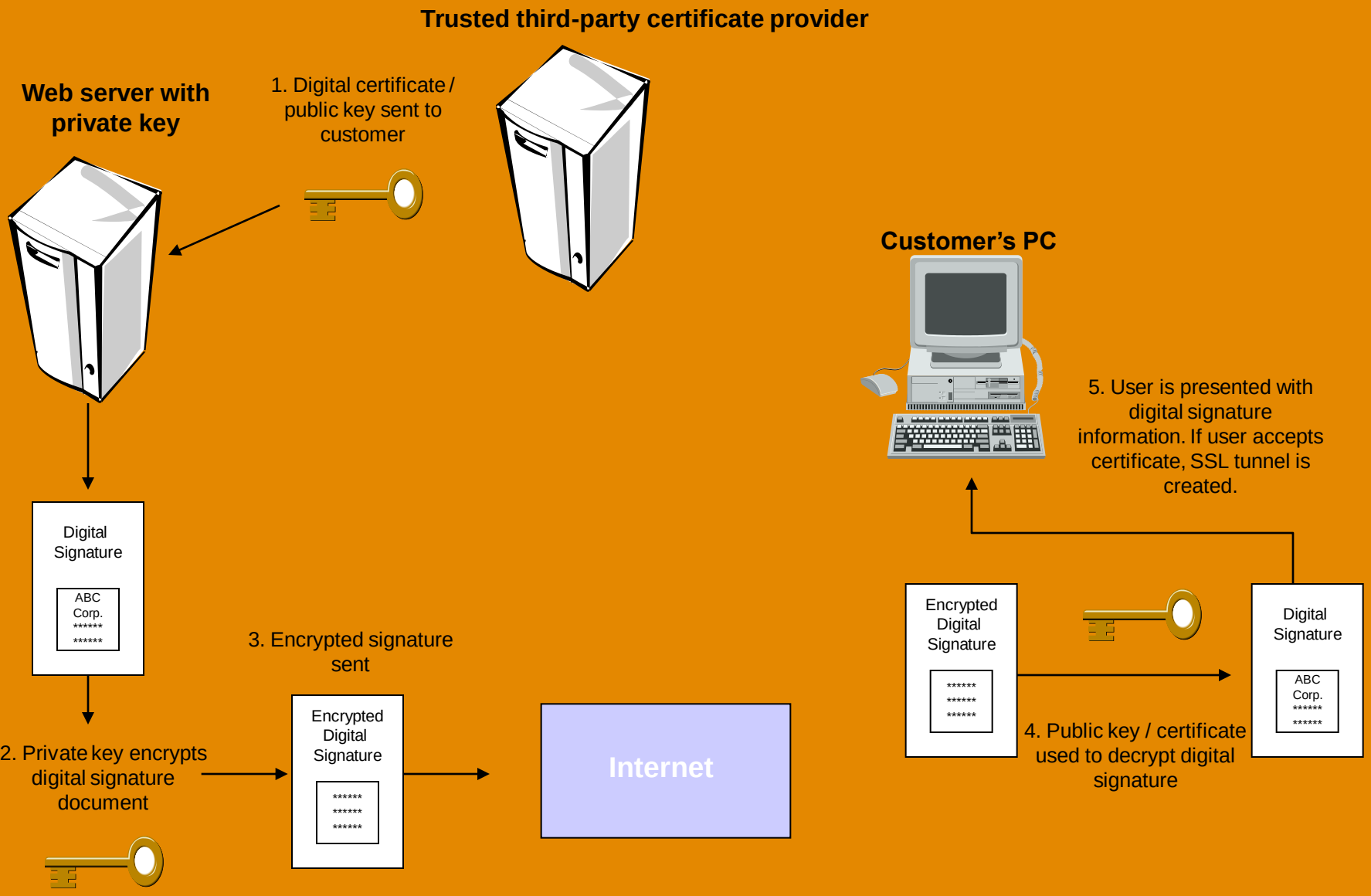
Digital Certificate Transmission in e-Commerce



Securing Companies from External Attack

- Screening Routers
  - **Can screen packets and determine, not only, whether they *can* forward a packet, but also, whether they *should* forward it**
- Proxy Servers
  - **Their primary purpose is to forward packets on behalf of PCs on a company's internal network to the Internet**
  - **Also provide *caching***
- Firewalls
  - **A computer that sits between the Internet and anything a company wants to protect (such as a Web server or internal network)**

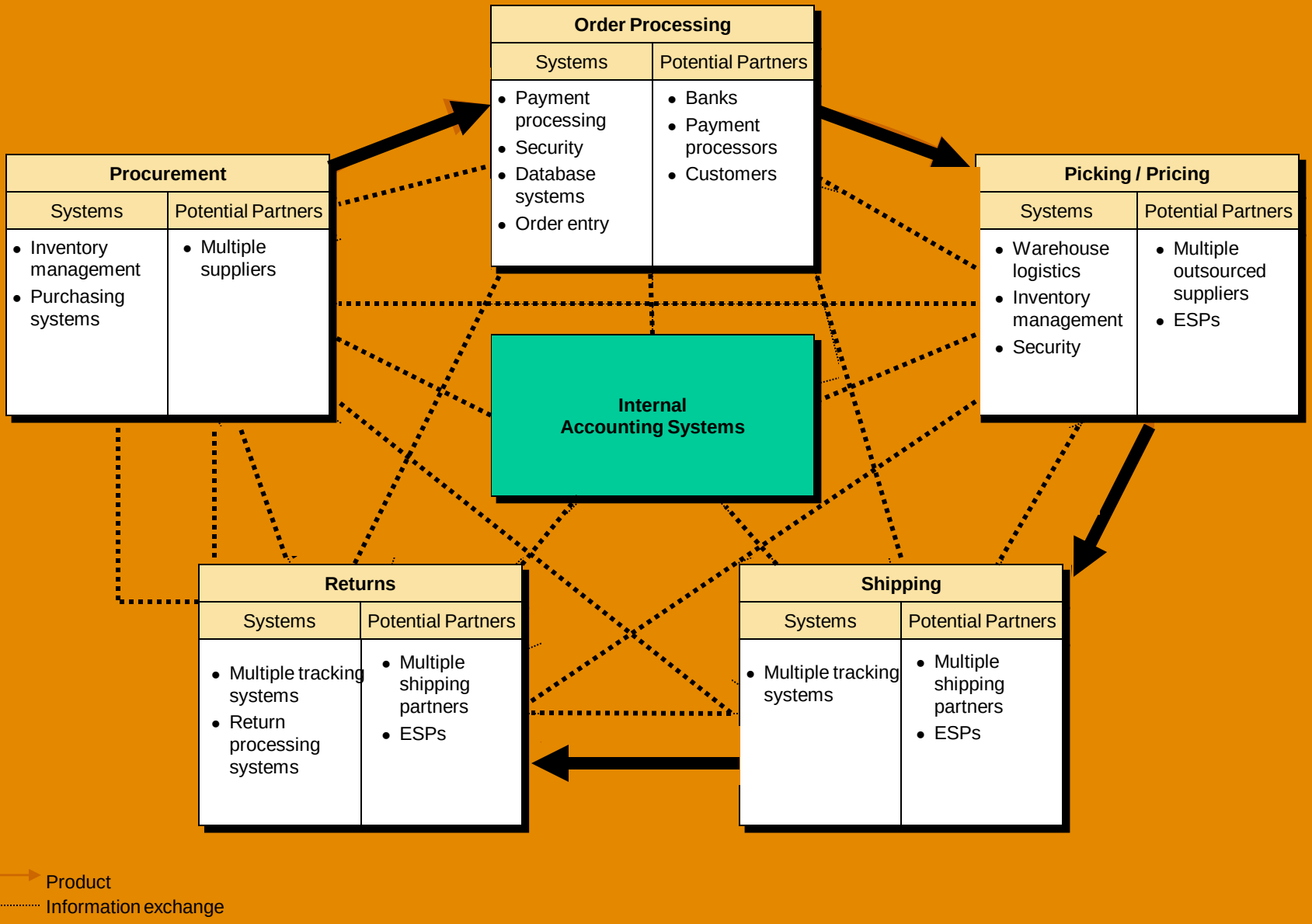
Digital Signature Authentication



Fulfillment: Bricks-and-Mortar

- **Includes all steps necessary to distribute the company's products. Examples:**
  - **Wal-Mart: the creation of distribution network of regional warehouses, trucks, and retail stores**
  - **Fingerhut: the building of relationships with suppliers and creation of a system to deliver purchased items to customers**

Fulfillment: e-Commerce

- **Issues Facing e-commerce fulfillment:**
  - **Customer Demand for Transparency**
    - e.g., product availability, shipping status
  - **Many Activities and Parties**
    - e.g., a variety of customrer-preferred variables
  - **Multiple Technology Systems**
    - e.g., web database and organizational database
  - **Trying to "Level" Capacity Utilization**
    - e.g., accomodate peaks by using third-party partners rather than building excess fullfillment capacity

Fulfillment — Integrating Multiple Partners, Technologies, and Systems