Chapter 4

IT Infrastructure: Hardware and Software
STUDENT OBJECTIVES

• Identify and describe the components of IT infrastructure.

• Identify and describe the major types of computer hardware, data storage, and input and output technology.

• Identify and describe the major types of computer software used in business.
• Assess contemporary hardware and software trends.

• Evaluate the principal issues in managing hardware and software technology.
DreamWorks Animation Turns to Technology for Production Support

- **Problem:** Gaining an edge in an intensely competitive market, working with technology-intensive processes.
- **Solutions:** Deploy custom-built EMO software to render more realistic animations and increase quality of films.
- **HP processors and high-speed network** facilitate rapid production schedule, increasing productivity.
- Demonstrates IT’s role in strengthening a firm’s product and productivity beyond what human talent can accomplish.
- Illustrates digital technology’s role in gaining an advantage in a fiercely competitive market.
Interactive Session: DreamWorks Animation

• What is your opinion of DreamWorks Animation’s decision to invest heavily in information technology rather than superior people resources?

• What other industries can you think of that could benefit from a similar approach?

• What kinds of firms do you think would be better off taking the opposite approach?
Infrastructure Components

• Computer hardware
• Computer software
• Data management technology
• Networking and telecommunications technology
• Technology services
Types of Computers

- Computers come in different sizes with varying capabilities for processing information
  - FLOPS
- Personal computer (PC)
- Workstation
- Midrange computers: servers and minicomputers
- Mainframe
- Supercomputer
Types of Computers

- Grid computing
- Client/server computing
- Multitiered (N-tier) client/server architectures
- Web server
- Application server
In client/server computing, computer processing is split between client machines and server machines linked by a network. Users interface with the client machines.

Figure 4-2
Storage, Input, and Output Technology

• Secondary storage technology
  • Magnetic disk: hard drives, USB flash drives, RAID
  • Optical disks: CD-ROM, CD-RW, DVD
  • Magnetic tape
  • Storage networking: SANs

• Input devices gather data and convert them into electronic form

• Output devices display data after they have been processed

• Batch and online processing
Contemporary Hardware Trends

- Integration of computing and telecommunications platforms
- Edge computing
- Autonomic computing
Operating System Software

• The software that manages and controls the computer’s activities

• PC operating systems and graphical user interfaces
  • GUIs
  • Windows XP, Windows Vista, and Windows Server 2003
  • UNIX
  • Linux
  • Open-source software
The relationship among the system software, application software, and users can be illustrated by a series of nested boxes. System software—consisting of operating systems, language translators, and utility programs—controls access to the hardware. Application software, including programming languages and “fourth-generation” languages, must work through the system software to operate. The user interacts primarily with the application software.

Figure 4-6
The Corporate World Migrates to Open-Source

- Read the Focus on Technology and then discuss the following questions:
  - What problems do Linux and other open-source software help companies address?
  - How does open-source software help?
  - What issues and challenges does deploying open-source software raise?
  - What can be done to address these issues?
  - Describe what you think is a sound strategy for deploying Linux and other open-source components at this stage of their evolution.
Interactive Session: Open-Source

• Search the Internet for the latest news on open-source in the corporate world and look specifically for the following topics:
  • Percentage of enterprises that use open-source
  • Money being saved by enterprises as a result of open-source
  • Problems resulting from the adoption of open-source
  • Relationship between Microsoft and Linux
Application Software and Desktop Productivity Tools

- Application programming languages for business
- Fourth-generation languages
- Software packages and desktop productivity tools
  - Word processing software
  - Spreadsheets
  - Data management software
  - Presentation graphics
  - Integrated software packages and software suites
  - E-mail software
  - Web browsers
  - Groupware
Software for the Web: Java and HTML

- Java
  - Operating system-independent, processor-independent, object-oriented programming language
  - Leading interactive programming environment for the Web
- Hypertext markup language (HTML)
  - Page description language for specifying how elements are placed on a Web page and for creating links to other pages and objects
Software for Enterprise Integration

- Legacy systems: replace or integrate?
  - Middleware
  - Enterprise application integration (EAI) software
- Web services and service-oriented architecture
  - XML
  - SOAP
  - WSDL
  - UDDI
  - SOA
Enterprise Application Integration (EAI) Versus Traditional Integration

EAI software (a) uses special middleware that creates a common platform with which all applications can freely communicate with each other. EAI requires much less programming than traditional point-to-point integration (b).

Figure 4-9
The Benefits and Challenges of a Service-Oriented Architecture

- Read the Focus on Organizations and then discuss the following questions:
  - What problems do Web services and service-oriented architectures help companies solve?
  - How did companies described in this case benefit from SOA?
  - How can the benefits of an SOA trickle down to consumers and the clients of companies that employ the architecture?
  - What challenges and issues were raised by those who have experience with SOAs?
  - Is an SOA the best solution in all cases?
Software Trends: Mashups, Web 2.0, and Distributed Software Applications

- Mashups: combined applications that depend on high-speed data networks, universal communication standards, and open-source code.
- Web mashups combine two or more online applications to create a new application or service that provides more value than the original pieces.
- Google: an extreme example of distributed computing.
Important issues faced by managers of hardware and software technology:

- Capacity planning and scalability
- Total cost of ownership (TCO) of technology assets
- Using technology service providers
  - Outsourcing
  - On-demand computing
  - Application service providers (ASPs)