



Chapter 4

IT Infrastructure: Hardware and Software



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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.**



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STUDENT OBJECTIVES (Continued)

- **Assess contemporary hardware and software trends.**
- **Evaluate the principal issues in managing hardware and software technology.**



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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.



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DreamWorks Animation Turns to Technology for Production Support

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?**



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IT Infrastructure: Computer Hardware

Infrastructure Components

- **Computer hardware**
- **Computer software**
- **Data management technology**
- **Networking and telecommunications technology**
- **Technology services**



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IT Infrastructure: Computer Hardware

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**



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IT Infrastructure: Computer Hardware

Types of Computers

- **Grid computing**
- **Client/server computing**
- **Multitiered (N-tier) client/server architectures**
- **Web server**
- **Application server**

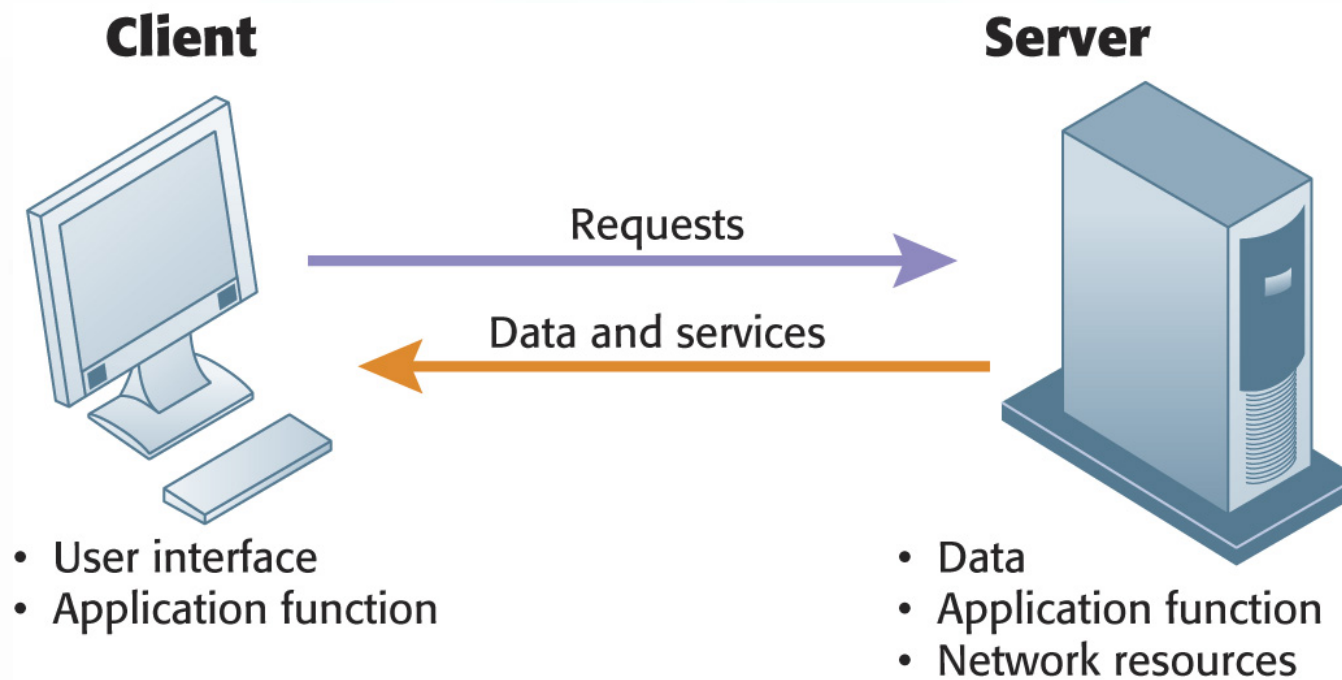


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Client/Server Computing



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



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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**



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Contemporary Hardware Trends

- **Integration of computing and telecommunications platforms**
- **Edge computing**
- **Autonomic computing**



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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**

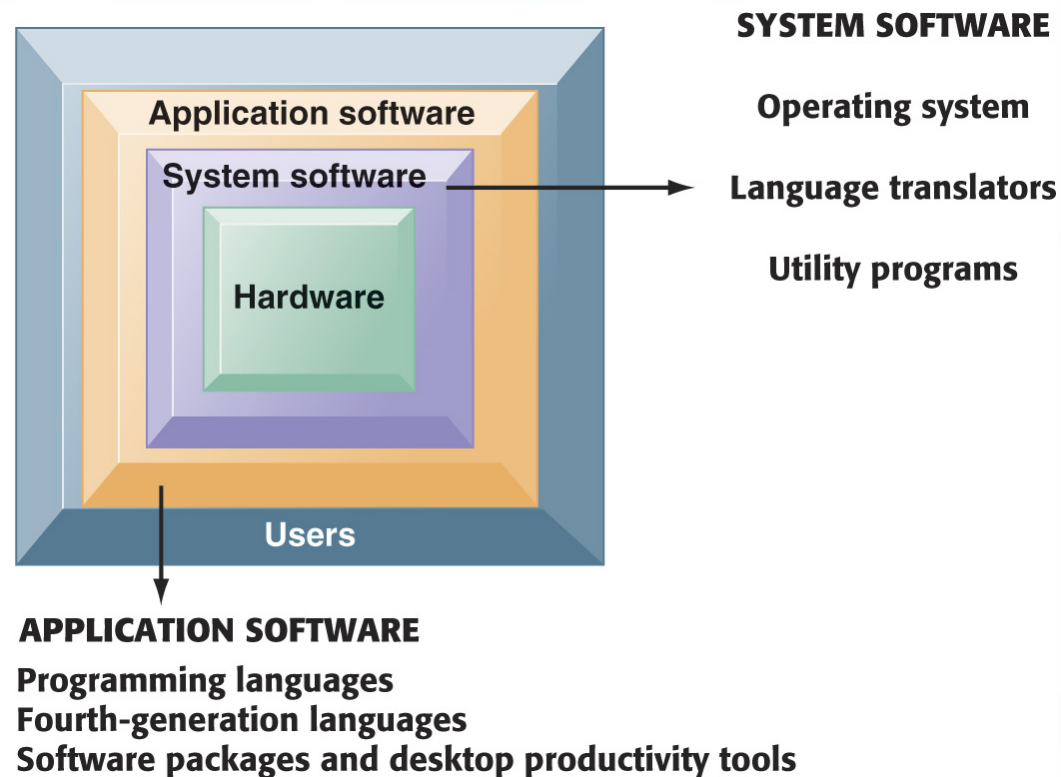


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IT Infrastructure: Computer Software

The Major Types of 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



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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.



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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**



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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



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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



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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**

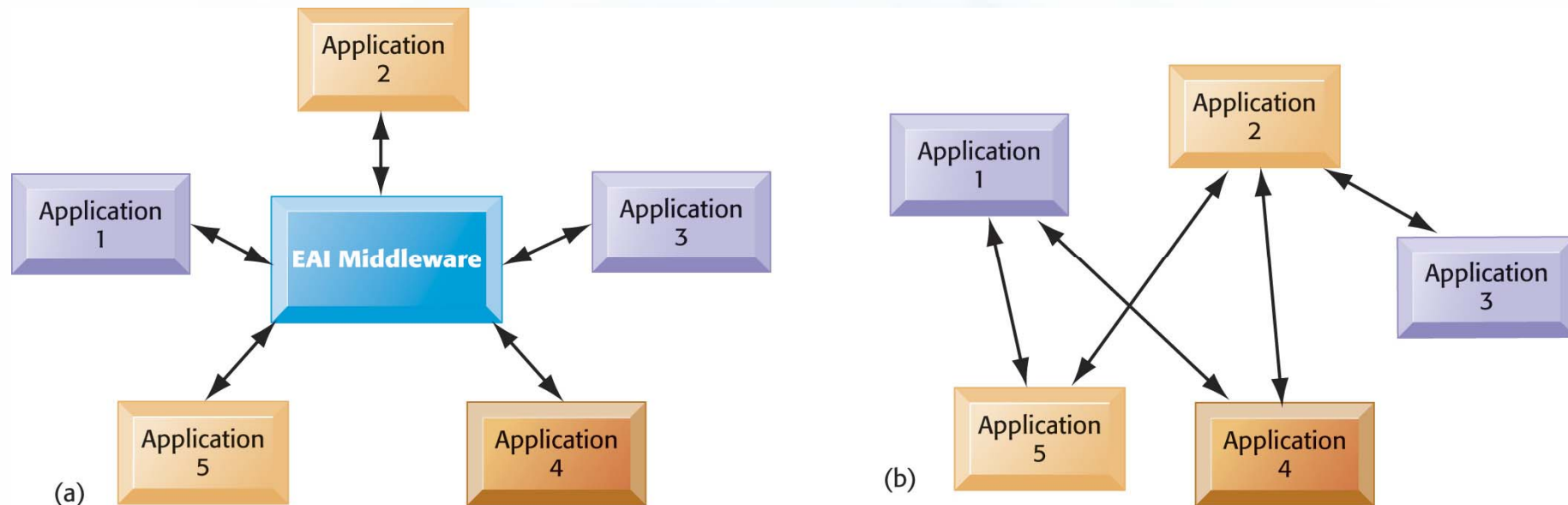


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Enterprise Application Integration (EAI) Versus Traditional Integration



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



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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?



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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**



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Managing Hardware and Software Technology

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)