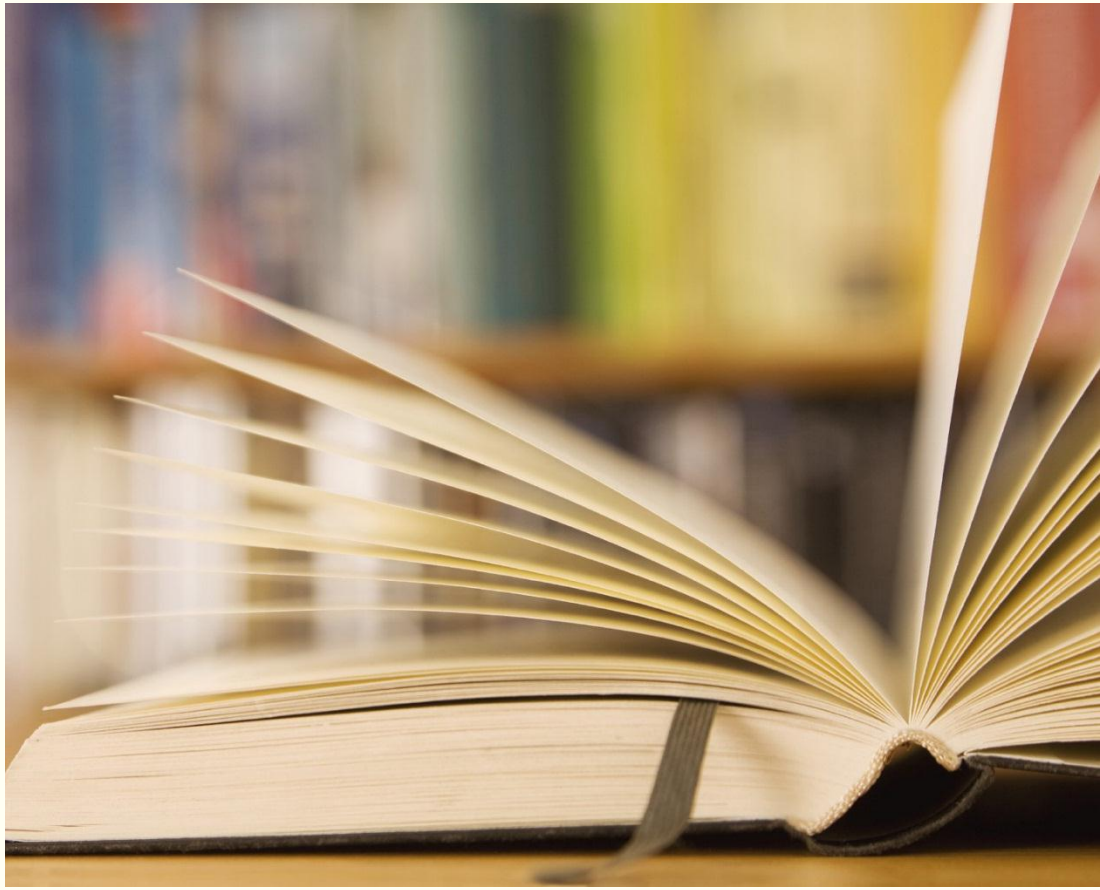
IT INFRASTRUCTURE: HARDWARE AND SOFTWARE

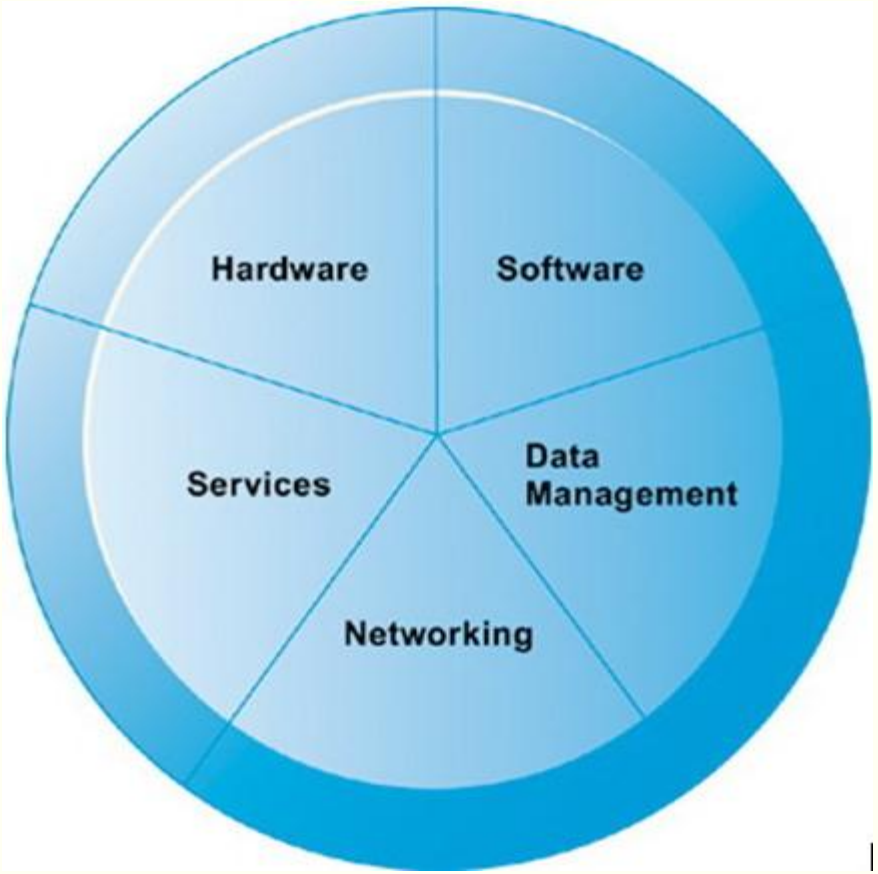


Our Materials

- What are the components of IT infrastructure?
- What are the major computer hardware, data storage, input, and output technologies used in business and the major hardware trends?
- What are the major types of computer software used in business and the major software trends?
- What are the principal issues in managing hardware and software technology?

1. What are the components of IT infrastructure?

- If you want to know why businesses worldwide spend about $3.8 trillion annually on computing and information systems, just consider what it would take for you personally to set up a business or manage a business today. Businesses require a wide variety of computing equipment, software, and communications capabilities simply to operate and solve basic business problems



IT infrastructure component

- Computer Hardware
- Computer Software
- Data Management Technology
- Networking and Telecommunications Technology
- Technology Services

Computer Hardware

- Computer hardware consists of technology for computer processing, data storage, input, and output. This component includes large mainframes, servers, desktop and laptop computers, and mobile devices for accessing corporate data and the Internet. It also includes equipment for gathering and inputting data, physical media for storing the data, and devices for delivering the processed information as output.

Computer Software

- Computer software includes both system software and application software. System software manages the resources and activities of the computer. Application software applies the computer to a specific task for an end user, such as processing an order or generating a mailing list.

Data Management Technology

- In addition to physical media for storing the firm’s data, businesses need s pecialized software to organize the data and make them available to business users.

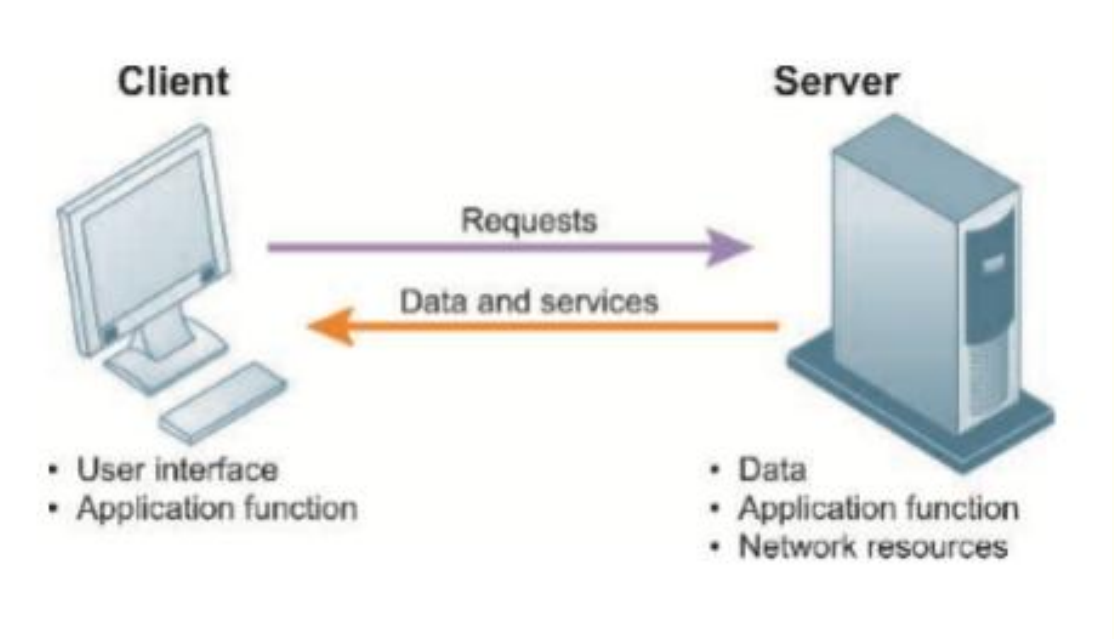
Networking and Telecommunications Technology

- In Networking and telecommunications technology provides data, voice, and video connectivity to employees, customers, and suppliers. It includes technology for running a company's internal networks, services from telecommunications/telephone services companies, and technology for running websites and linking to other computer systems through the Internet

Technology Services

- Businesses need people to run and manage the infrastructure components we have just described and to train employees in how to use these technologies for their work.

Computer networks and Client/Server Computing



Input and output Devices

Input Device	Description
Keyboard	Principal method of data entry for text and numerical data.
Computer mouse	Handheld device with point-and-click capabilities for controlling a cursor's position on a computer display screen and selecting commands. Trackballs and touch pads often are used in place of the mouse as pointing devices on laptop PCs.
Touch screen	Device that allows users to interact with a computer by touching the surface of a sensitized display screen. Used in kiosks in airports, retail stores, and restaurants and in multitouch devices such as the iPhone, iPad, and multitouch PCs.
Optical character recognition	Device that can translate specially designed marks, characters, and codes into digital form. The most widely used optical code is the bar code.
Magnetic ink character recognition (MICR)	Technology used primarily in check processing for the banking industry. Characters on the bottom of a check identify the bank, checking account, and check number and are preprinted using special magnetic ink for translation into digital form for the computer.
Pen-based input	Handwriting-recognition devices that convert the motion made by an electronic stylus pressing on a touch-sensitive tablet screen into digital form.
Digital scanner	Device that translates images, such as pictures or documents, into digital form.
Audio input	Input devices that convert voice, music, or other sounds into digital form for processing by the computer.
Sensors	Devices that collect data directly from the environment for input into a computer system. For instance, farmers can use sensors to monitor the moisture of the soil in their fields.

Output Device	Description
Display	Often a flat-panel (LCD) display screen.
Printers	Devices that produce a printed hard copy of information output. They include impact printers (such as dot matrix printers) and nonimpact printers (such as laser, inkjet, and thermal transfer printers).
Audio output	Output devices that convert digital output data back into intelligible speech, music, or other sounds.

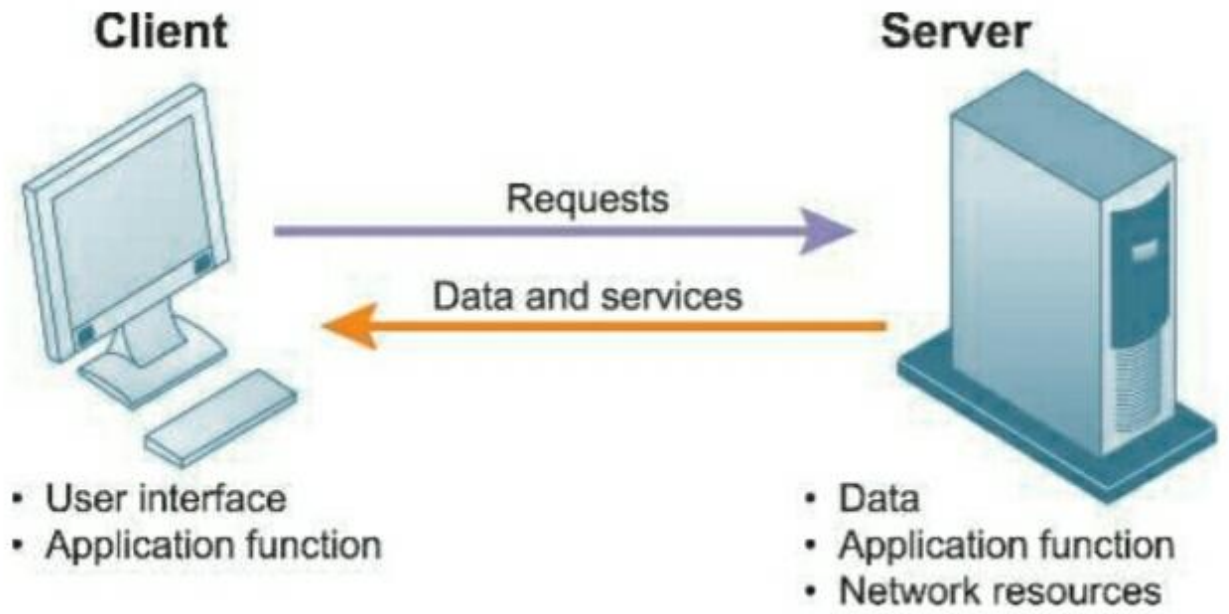
2. What are the major computer hardware, data storage, input, and output technologies used in business and the major hardware trends?

- Business firms face many challenges and problems that computers and information systems can solve. To be efficient, firms need to match the right computer hardware to the nature of the business challenge, neither overspending nor underspending for the technology.

Types Of Computers

Computer Network and Client/Server Computing

Figure 5.2
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.



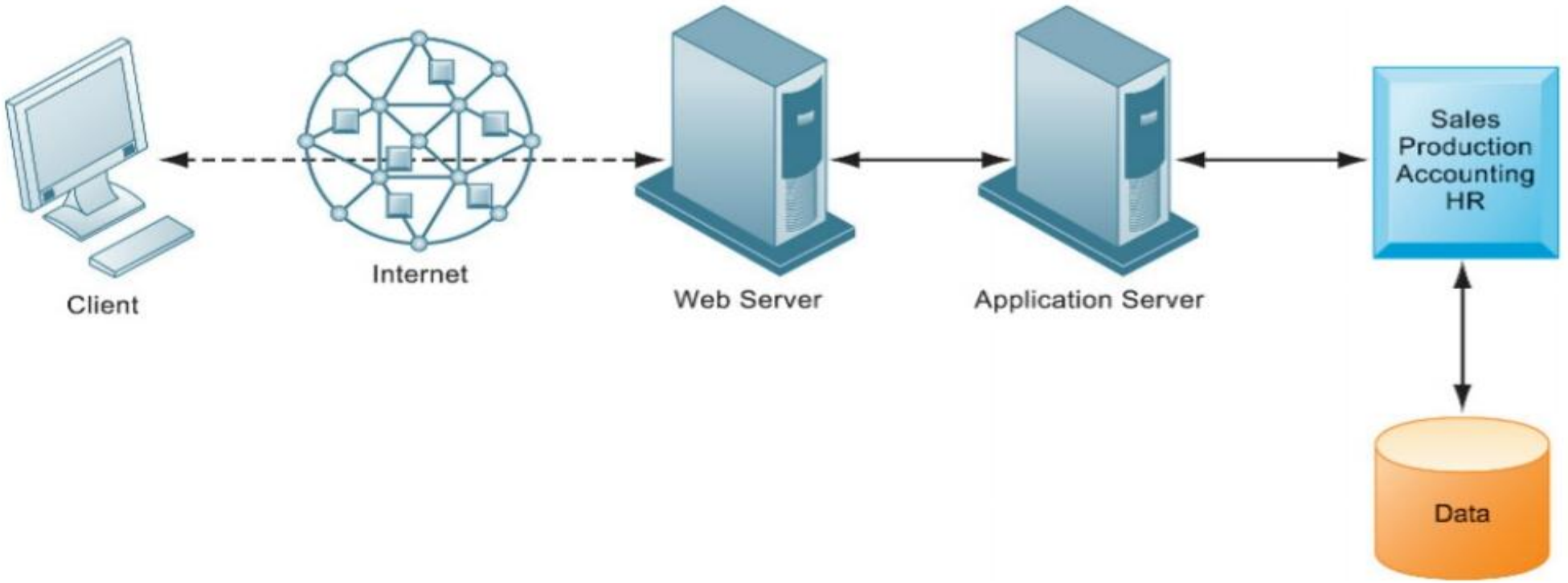
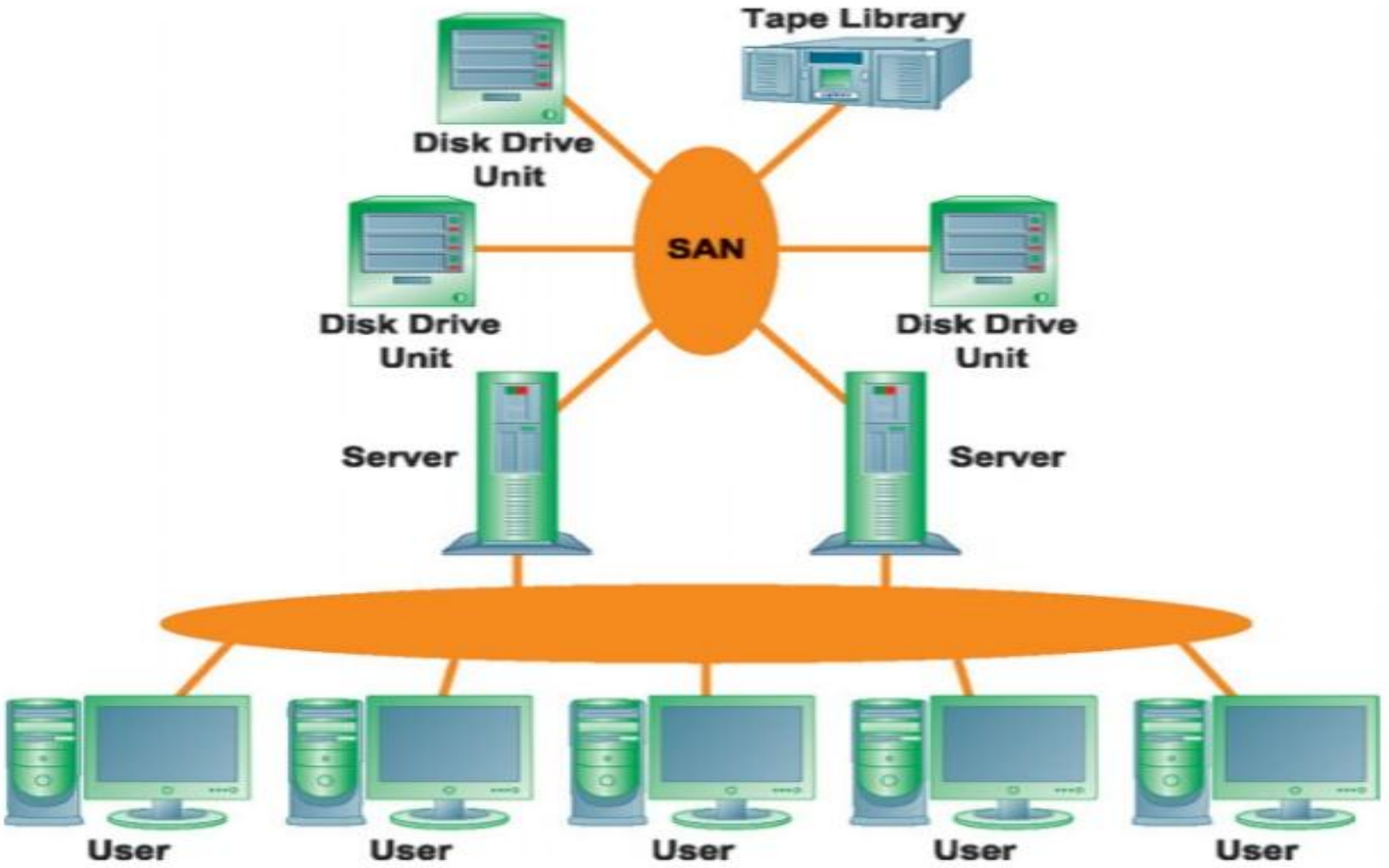


Figure 5.3
A Multitiered Client/Server Network (N-Tier)
In a multitiered client/server network, client requests for service are handled by different levels of servers.

Secondary, Input, and Output Technology

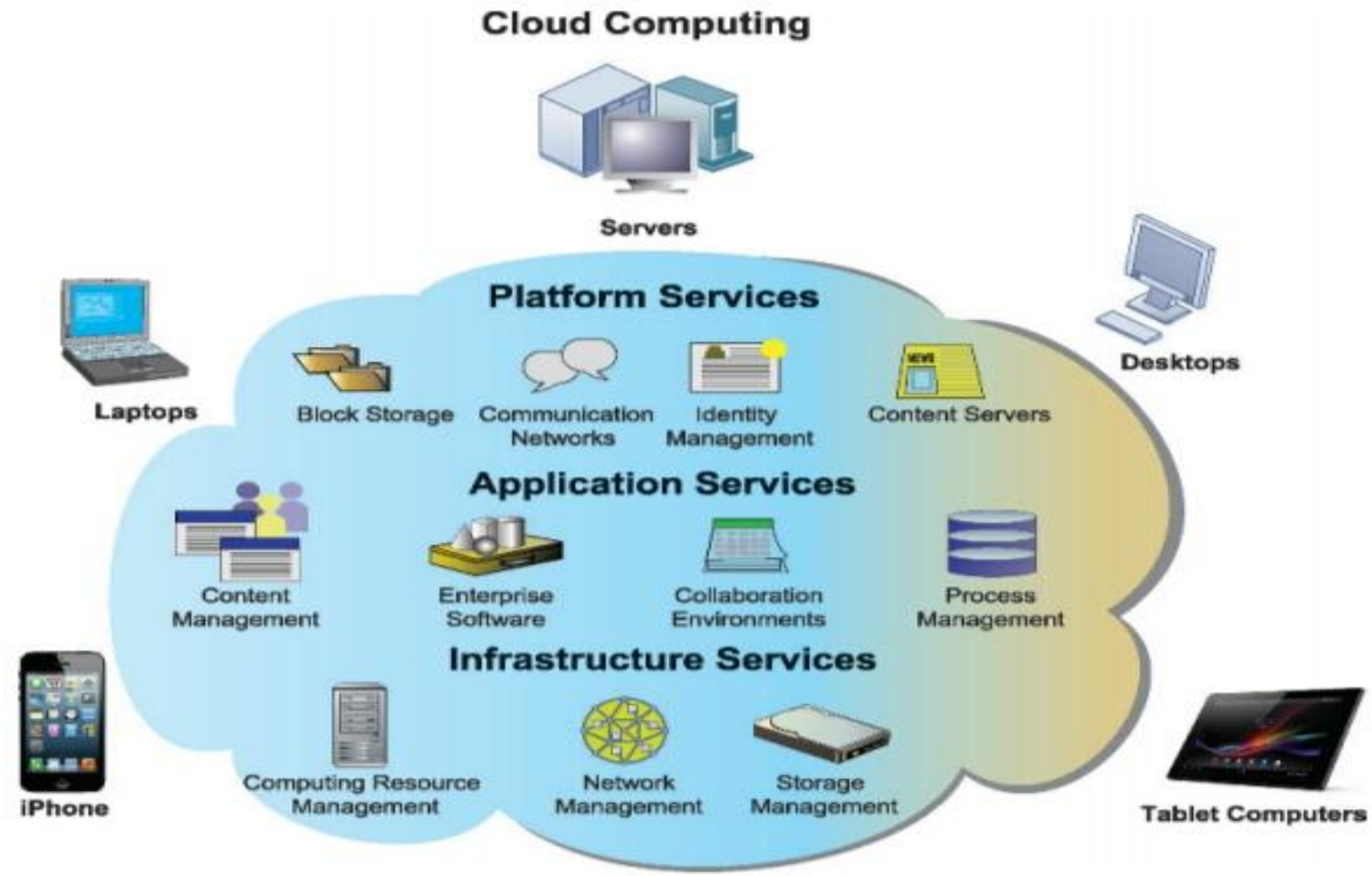
- Secondary Storage Technology
- Input and Output Devices

Contenporary Hardware Trends



- The Mobile Digital Platfrom
- Nanotechnology and Quantum Computing
- Virtualization

- Cloud Computing



- Green Computing
- High-Performance and Power-Saving Processor

3. What are the major types of computer software used in business and the major software trends?

- To use computer hardware, you need software, which provides the detailed instructions that direct the computer's work. System software and application software are interrelated and can be thought of as a set of nested boxes, each of which must interact closely with the other boxes surrounding it

Operating System Software

PC, Server, and Mobile operating Systems

Operating System	Features
Windows 10	Most recent Windows client operating system, which supports multitouch and mobile devices as well as traditional PCs and includes voice search capabilities.
Windows Server	Windows operating system for servers.
UNIX	Used for PCs, workstations, and network servers. Supports multitasking, multiuser processing, and networking. Is portable to different models of computer hardware.
Linux	Open source, reliable alternative to UNIX and Windows operating systems that runs on many types of computer hardware and can be modified by software developers.
OS X	Operating system for the Macintosh computer that is highly visual and user-friendly, with support for multitouch. Most recent version is OS X El Capitan. The iPhone's iOS operating system is derived from OS X.

Application Software And Desktop Productivity Tools

It is important to know which software tools and programming languages are appropriate for the work your business wants to accomplish.

Programming Languages For Business

- Popular programming languages for business applications include C, C++, Visual Basic, and Java.
- Other popular programming tools for web applications include Ruby, Python, and PHP.

Software packages and Desktop productivity Tools

Software Tool	Capabilities	Example
Word processing	Allows the user to make changes in a document electronically, with various formatting options.	Microsoft Word WordPerfect
Spreadsheet	Organizes data into a grid of columns and rows. When the user changes a value or values, all other related values on the spreadsheet are automatically recalculated. Used for modeling and what-if analysis (see Figure 5.8) and can also present numeric data graphically.	Microsoft Excel iWork Numbers
Data management	Creates files and databases in which users can store, manipulate, and retrieve related data. Suitable for building small information systems.	Microsoft Access
Presentation graphics	Creates professional-quality electronic graphics presentations and computerized slide shows; can include multimedia displays of sound, animation, photos, and video clips.	Microsoft PowerPoint iWork Keynote
Personal information management	Creates and maintains appointments, calendars, to-do lists, and business contact information; also used for email.	Microsoft Outlook
Desktop publishing	Creates professional-looking documents, brochures, or books	Adobe InDesign

HTML AND HTML5

Plain English	HTML
Subcompact	<TITLE>Subcompact</TITLE>
4 passenger	<LI>4 passenger</LI>
$16,800	<LI>$16,800</LI>

- **Hypertext Markup Language (HTML)** is a page description language for specifying how text, graphics, video, and sound are placed on a web page and for creating dynamic links to other web pages and objects.

Web Services

- Web services refer to a set of loosely coupled software components that exchange information with each other using universal web communication standards and languages.
- The foundation technology for web services is XML, which stands for Extensible Markup Language. This language was developed in 1996 by the World Wide Web Consortium (W3C, the international body that oversees the development of the web) as a more powerful and flexible markup language than HTML for web pages.
- By tagging selected elements of the content of documents for their meanings, XML makes it possible for computers to manipulate and interpret their data automatically and perform operations on the data without human intervention

Software Trends

- Today there are many more sources for obtaining software and many more capabilities for users to create their own customized software applications. Expanding use of open source software and cloud-based software tools and services exemplify this trend.

Open Source Software

- As noted earlier, open source software is developed by a community of programmers around the world, who make their programs available to users under one of several licensing schemes. Essentially, users of the software can use the software as is, modify it at will, and even include it in for-profit software applications.

Cloud-Based Software Services and Tools

- Web mashups combine the capabilities of two or more online applications to create a kind of hybrid that provides more customer value than the original sources alone. For instance, ZipRealty uses Google Maps and data provided by online real estate database Zillow.com to display a complete list of multiple listing service (MLS) real estate listings for any zip code the user specifies.

- Apps are small specialized software programs that run on the Internet, on your computer, or on your mobile phone or tablet and are generally delivered over the Internet. Google refers to its online services as apps, including the Google Apps suite of desktop productivity tools, but when we talk about apps today, most of the attention goes to the apps that have been developed for the mobile digital platform. It is these apps that turn smartphones and other mobile handheld devices into generalpurpose computing tools.

4. What are the principal issues in managing hardware and software technology?

Capacity Planning and Scalability

- Capacity planning is the process of predicting when a computer hardware system becomes saturated.
- It considers factors such as the maximum number of users that the system can accommodate at one time, the impact of existing and future software applications, and performance measures, such as minimum response time for processing business transactions.

Total Cost of Ownership (TCO) of Technology Assets

- The total cost of Ownership (TCO) model can be used to analyze these direct and indirect costs to help Determine the actual cost of owning a specific technology

Using Technology Service Providers

- Outsourcing
- Using Cloud Services

Managing Mobile Platforms

- For more critical business systems, more company control is required, and firms often turn to **mobile device management (MDM)** software, which monitors, manages, and secures mobile devices that are deployed across multiple mobile service providers and across multiple mobile operating systems being used in the organization.

Managing software localization for global Business

- Software may have to be built with local language interfaces before a new information system can be successfully implemented worldwide.

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