Chapter 3: Information and Communications Technologies: The Enterprise Architecture

Learning objectives

1. Hardware components
2. Software types
3. Network types and protocols
4. Enterprise architecture

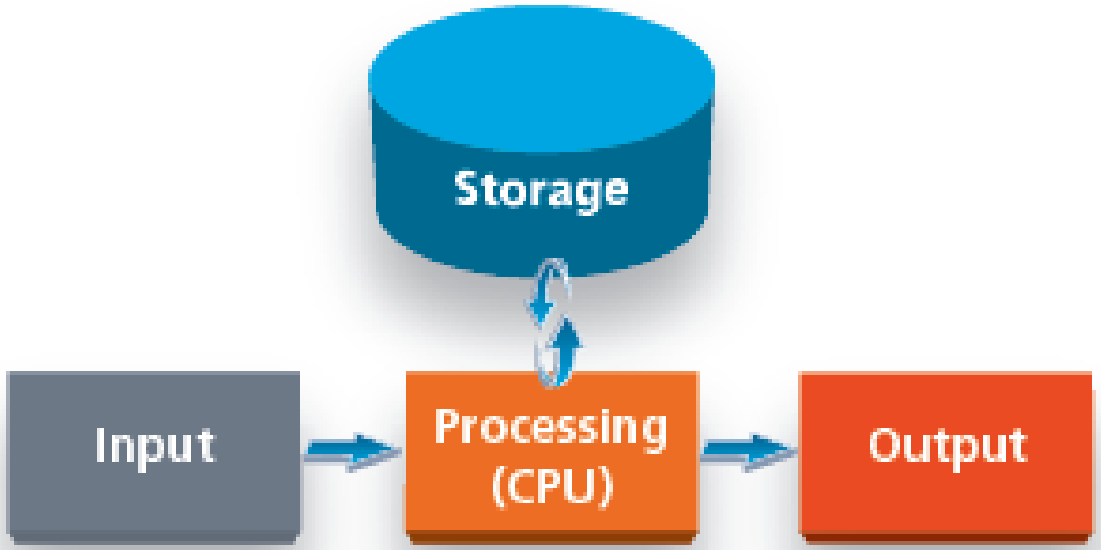
Introduction

- Information and communications technology (ICT)
- Relevance for organizations

Hardware

FIGURE 3-2

Hardware components.



Input

- Keyboard
- Mouse and touch screen
- Microphone

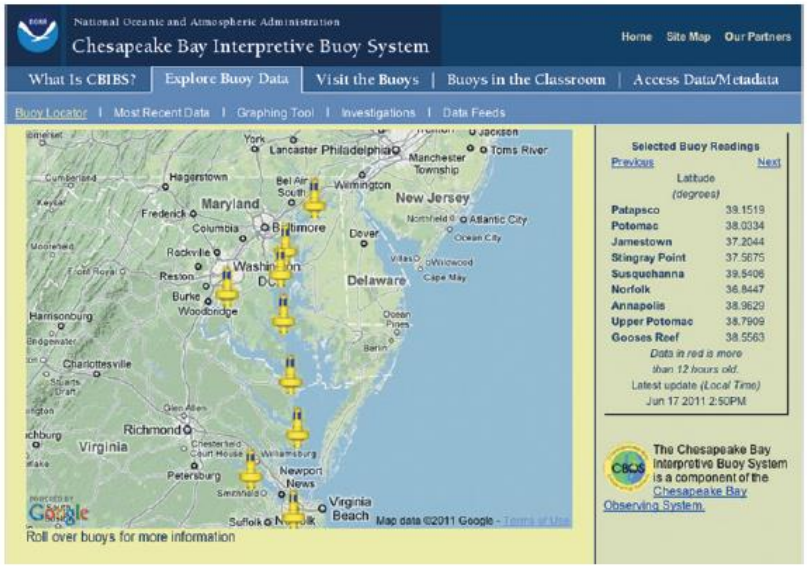
FIGURE 3-3
Input and output devices.

Source: Nikita Rogul/Shutterstock.

Scanners and sensors

- Optical scanners and digital cameras
- Radio frequency identification (RFID)
- Environmental sensors

FIGURE 3-8
Buoy sensors collect live data that is made available on the Internet.



Source: www.buoybay.org/site/public, accessed September 15, 2010.

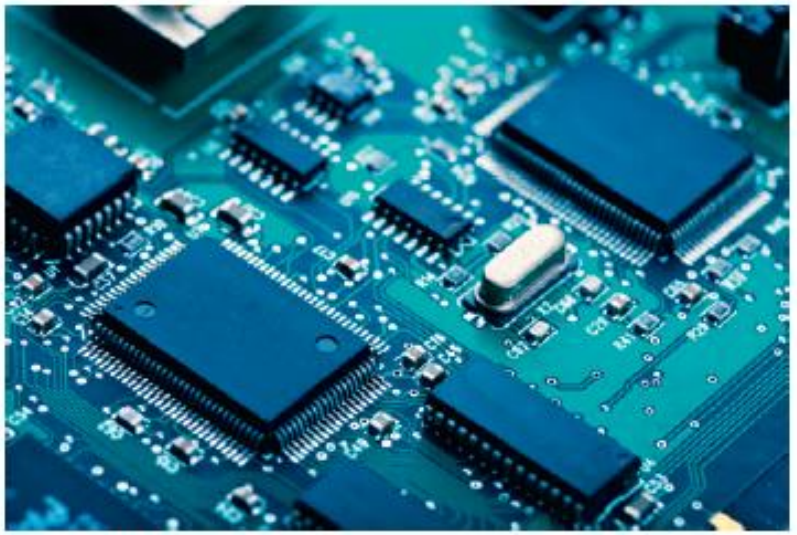
Output

- Monitors and screens
- Printers and speakers
- Controllers

Processing

- Central processing unit (CPU)
- Transistors
- Moore's Law

FIGURE 3-9
Integrated circuits.



Source: Olga Miltsova/Shutterstock.

Storage

- Bytes
- Temporary storage
- Permanent storage
- Business factors

FIGURE 3-11
Measures of storage capacity.

Name	Abbreviation	Capacity	Description
Kilobyte	KB	1,024 bytes	A short, text-only e-mail message
Megabyte	MB	1024^2 bytes	A digital song runs about 3 MB
Gigabyte	GB	1024^3 bytes	About 1 hour of TV recording (not HD)
Terabyte	TB	1024^4 bytes	About 150 hours of HD video recording
Petabyte	PB	1024^5 bytes	eBay's database: 52 PB (2012)

Types of software

- Application
- System
- Operating system
- Utility

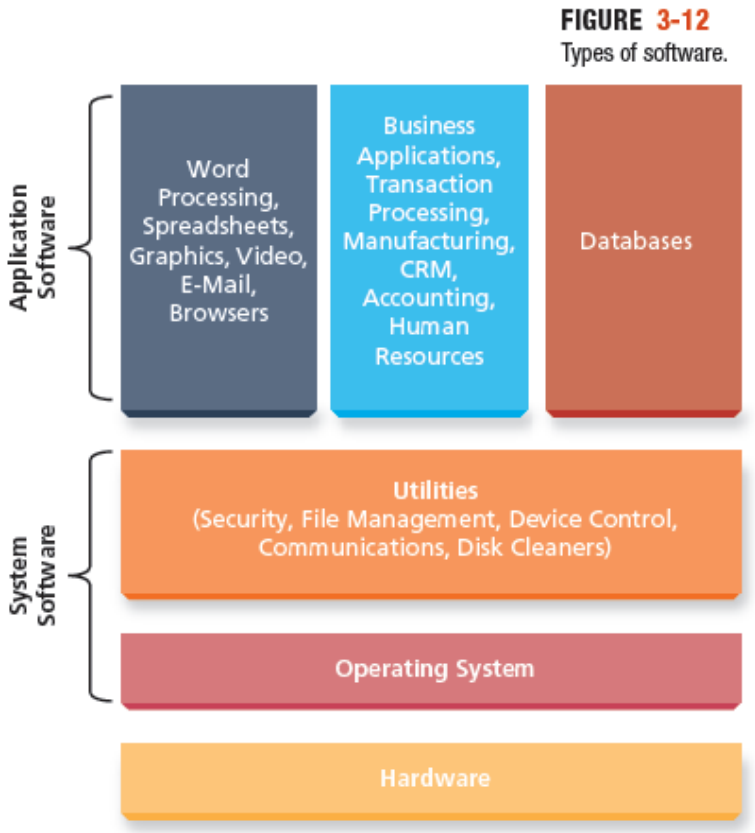


FIGURE 3-12
Types of software.

How is software created?

- Programming languages
- Source code
- Object-oriented programming

Development strategies

- Commercial off-the-shelf (COTS)
- Software as a service (SaaS)
- Custom software development

Open source

- Criteria
- Success
- Motivation

Networks

- Transmission media and protocols
- Wired media
- Wireless media

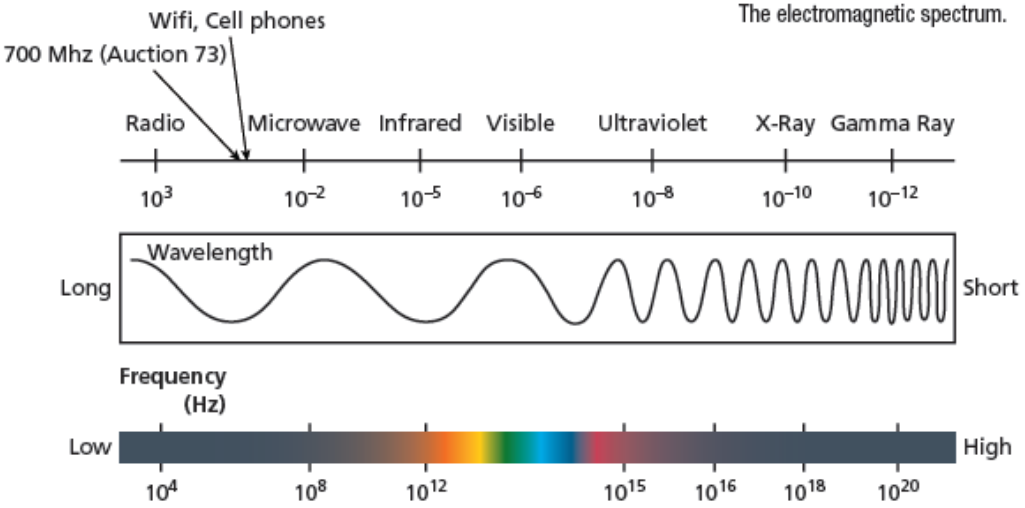
Wired media

- Twisted pair wires
- Coaxial cables
- Optical fiber

Wireless media (1:2)

- Waves
- Microwave transmission
- Wi-Fi and Bluetooth

FIGURE 3-19
The electromagnetic spectrum.



Source: Adapted from http://www.kollewin.com/blog/electromagnetic-spectrum/.

Wireless media (2:2)

- Spectrum
- Last mile

Types of networks (1:2)

- Local area network (LAN)
- Packet switching
- Voice over Internet Protocol (VoIP)

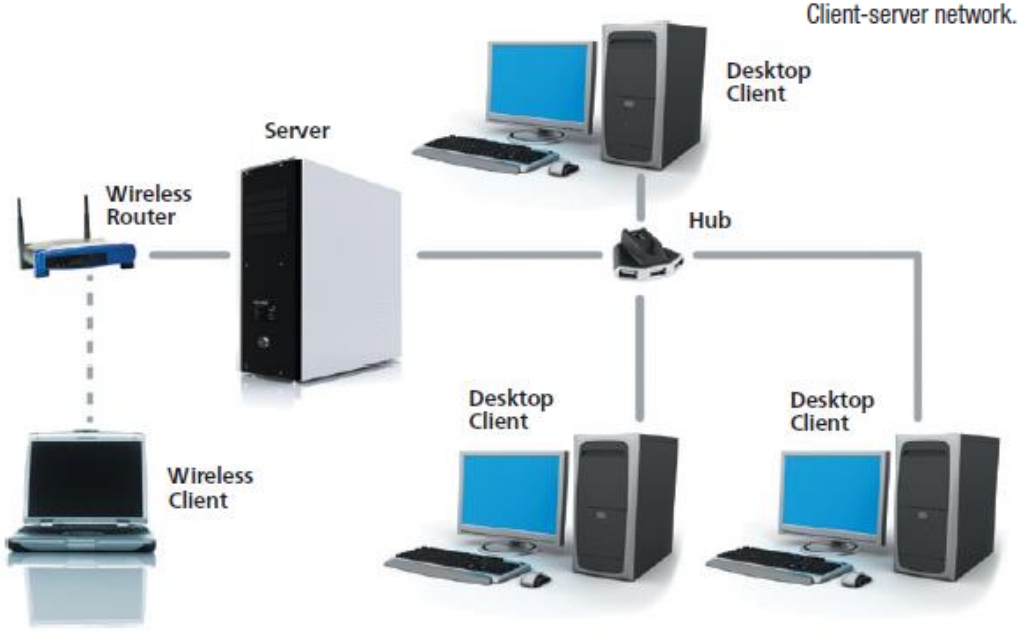
Type of Network	Geographic Area
Personal area network (PAN)	20–30 feet, for devices within reach
Local area network (LAN)	Home, office, school, building
Campus (or Corporate) area network (CAN)	Interconnected LANs encompassing several buildings for a university or a corporate campus
Metropolitan area network (MAN)	Interconnected LANs or CANs for a city
Wide area network (WAN)	Interconnected LANs, CANs, MANs covering a wide geographic area
Global area network (GAN)	Supports mobile communications across the globe, using a mix of satellite or other strategies

FIGURE 3-21
Types of networks.

Types of networks (2:2)

- Client server
- Peer-to-peer

FIGURE 3-22
Client-server network.



Source: Photos/illustrations: ArchMan/Shutterstock, Pokomeda/Shutterstock, Sashkin/Shutterstock.

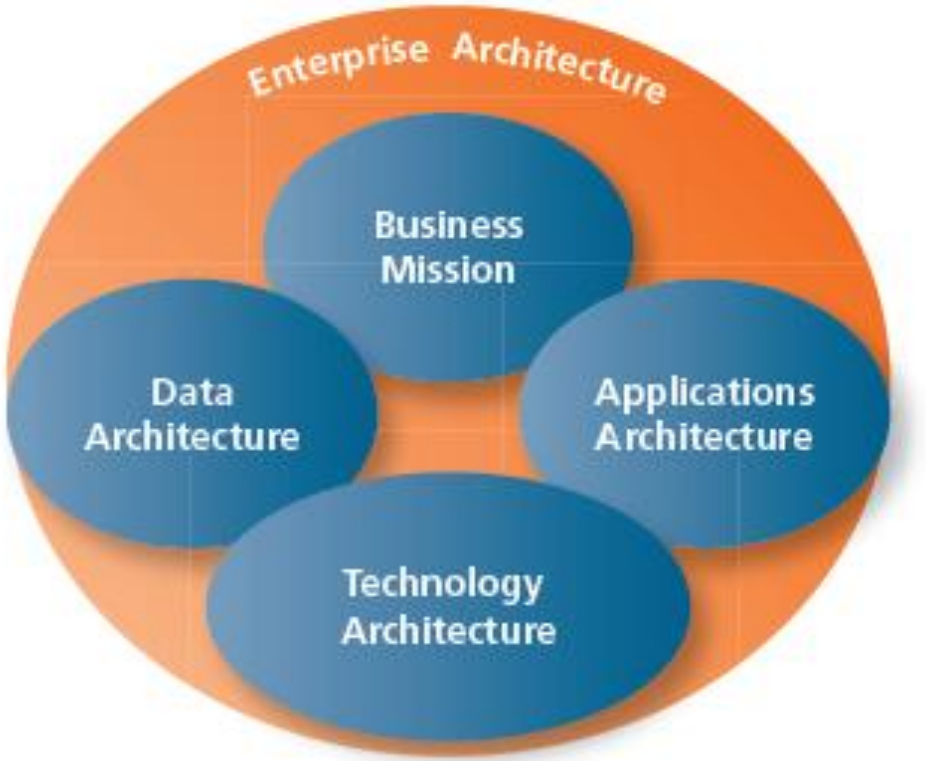
Network protocols

- Ethernet
- TCP/IP
- Wireless

Enterprise architecture

FIGURE 3-25

Components of an enterprise architecture.



Trends

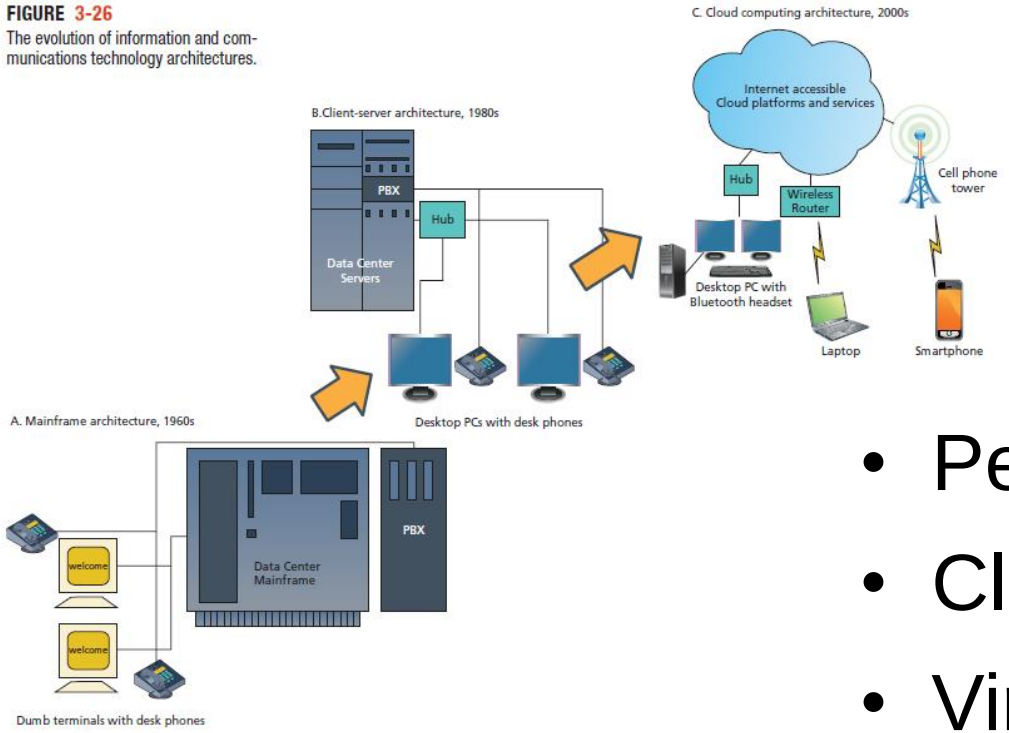


FIGURE 3-26
The evolution of information and communications technology architectures.

- Personal computers
- Client server
- Virtualization
- Cloud computing

Guiding the architecture

- Enterprise architect
- Human element

Job Opening: Enterprise Architect

As enterprise architect, you will lead the effort to analyze our company's business strategy, define the ICT architecture to support it, and create the roadmap for getting there. You must be familiar with business objectives and how technology solutions align with them. Superb communications and negotiation skills are essential. You will interact with business leaders in every department to understand needs, and develop a governance structure to guide decision making about technology investments. Salary in the low to mid $100s. Bachelor's degree in business with strong background in information systems required. MBA preferred.

FIGURE 3-28
Job opening: Enterprise architect.

Summary

1. Hardware components
2. Software types
3. Network types and protocols
4. Enterprise architecture

Google Glass

- Wearable technologies
- ‘Always On’
- Risks and concerns from fashion to privacy

Sprint case

- Need to place infrastructure to achieve 4th generation (4G) services
- Challenges faced by Sprint