

MANAGEMENT INFORMATION SYSTEM

Dr. Khine Thin Zar
Professor
CEIT Department
YTU

COURSE OUTLINES

- **Course Title**
 - Management Information Systems
- **Grading Policy**
 - Exam → 80%
 - Tutorial / Assignment → 20%
- **Textbook and Reference Materials**
 - Course Manual for Management Information Systems CIS302, University of Ibadan Distance Learning Centre
 - Management Information Systems (Managing The Digital Firm) by Kenneth C. Laudon(New York University), Jane P. Laudon(Azimuth Information Systems), Twelfth Edition
 - Management Information Systems, Sixth Edition, by Effy Oz
- **Course Duration**
 - 12 Weeks

IT Infrastructure and Emerging Technologies

LEARNING OUTCOMES

When you have studied this session, you should be able to:

- Understand IT infrastructure its components
- Recognize the stages and technology drivers of IT infrastructure evolution
- Understand the current trends in computer hardware platforms
- Understand the current trends in software platforms
- Define the challenges of managing IT infrastructure and management solutions

CONTENTS

- IT Infrastructure
- Infrastructure Components
- Contemporary Hardware Platform Trends
- Contemporary Software Platform Trends
- Management Issues

IT INFRASTRUCTURE

- The **foundation, or platform**, on which the firm can build its specific information systems
- The set of technology services it needs for the work it wants to accomplish **with information systems**
- Includes investment in **hardware, software, and services**—such as consulting, education, and training
- Provides the foundation for serving customers, working with vendors, and managing internal firm business processes

IT INFRASTRUCTURE (CONT.)

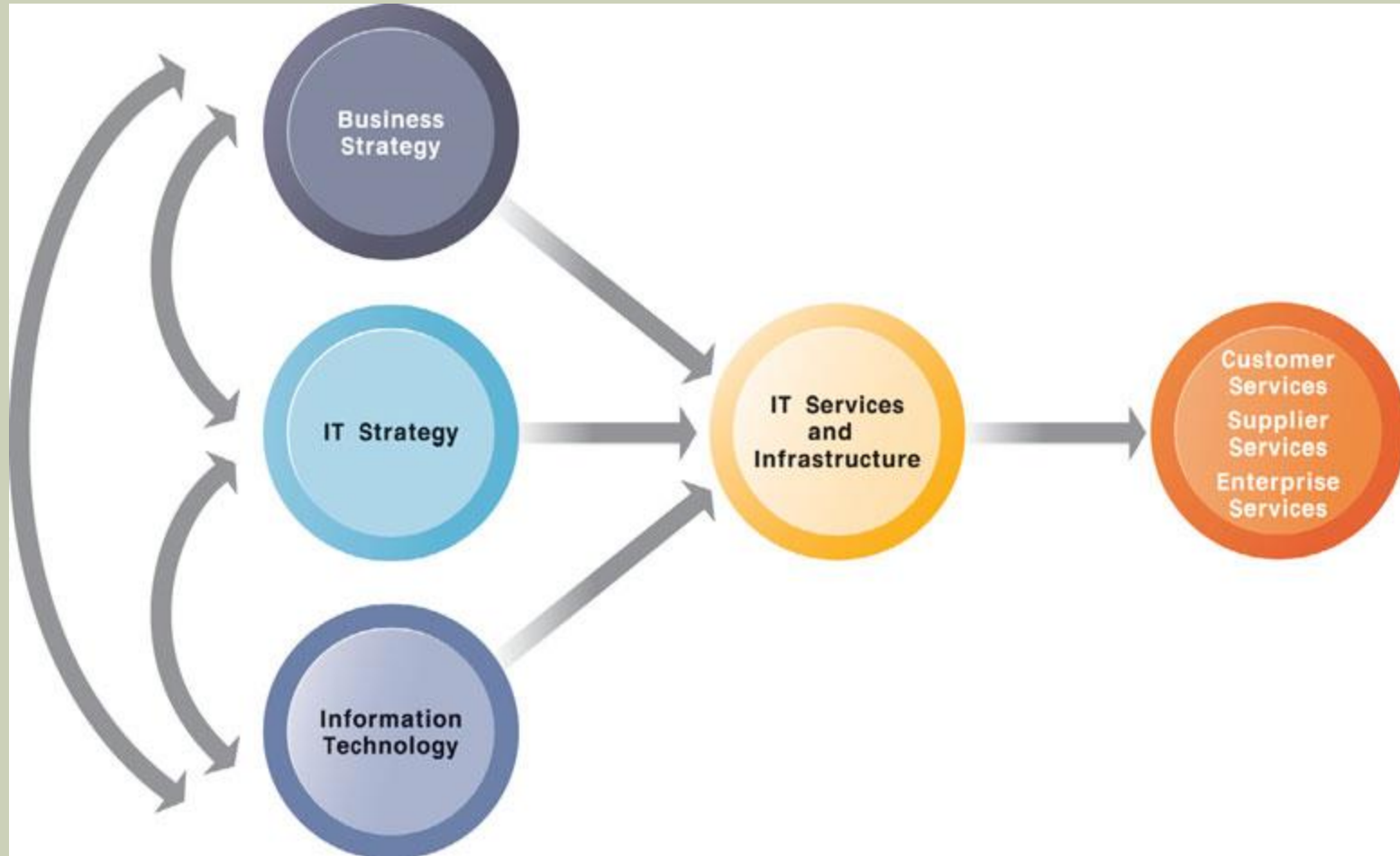


Figure: Connection between the firm IT infrastructure, and business capabilities ⁷

DEFINING IT INFRASTRUCTURE

- Consists of a set of physical devices and software applications
- A set of firmwide services budgeted by management and comprising both human and technical capabilities

Service Platforms

- **Computing platforms :**
 - provide computing services that connect employees, customers, and suppliers into a coherent digital environment
- **Telecommunications services:**
 - provide data, voice, and video connectivity to employees, customers, and suppliers

DEFINING IT INFRASTRUCTURE (CONT.)

- **Application software services:**
 - provide enterprise-wide capabilities such as enterprise resource planning, customer relationship management, supply chain management, and knowledge management systems
- **Physical facilities management services:**
 - develop and manage the physical installations required for computing, telecommunications, and data management services
- **IT management services:**
 - plan and develop the infrastructure, coordinate with the business units for IT services, manage accounting for the IT expenditure, and provide project management services

DEFINING IT INFRASTRUCTURE (CONT.)

■ IT standards services:

- provide the firm and its business units with policies that determine which information technology will be used, when, and how

■ IT education services:

- provide training in system use to employees and offer managers training in how to plan for and manage IT investments

■ IT research and development services:

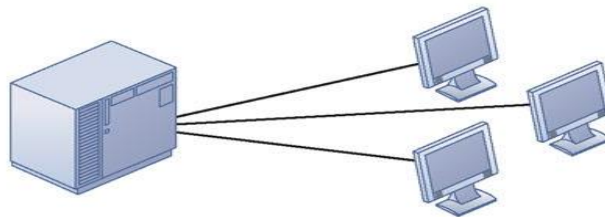
- provide the firm with research on potential future IT projects and investments that could help the firm differentiate itself in the marketplace

EVOLUTION OF IT INFRASTRUCTURE

- An outgrowth of over 50 years of evolution in computing platforms
- Five stages in this evolution
- A different configuration of computing power and infrastructure elements
 1. general-purpose mainframe and minicomputer computing,
 2. personal computers,
 3. client/server networks,
 4. enterprise computing, and
 5. cloud and mobile computing

Stages in IT Infrastructure Evolution

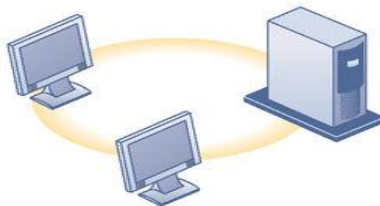
Mainframe/
Minicomputer
(1959–present)



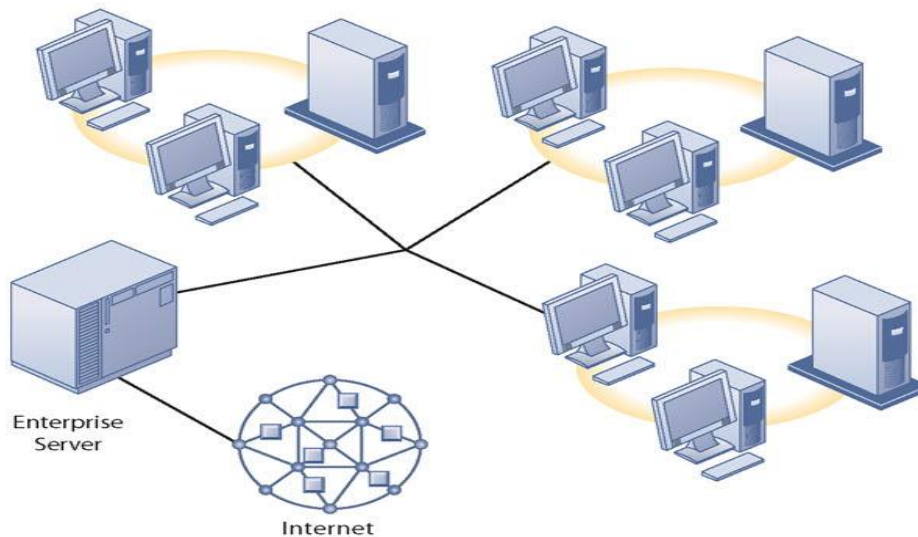
Personal
Computer
(1981–present)



Client/Server
(1983–present)



Enterprise
Computing
1992–present)



Cloud and Mobile
Computing
(2000–present)



INFRASTRUCTURE COMPONENTS

- Composed of **seven major components**
- Constitute investments that must be coordinated with one another to provide the firm with a coherent infrastructure
- A hardware and services provider such as IBM cooperates with all the major enterprise software providers

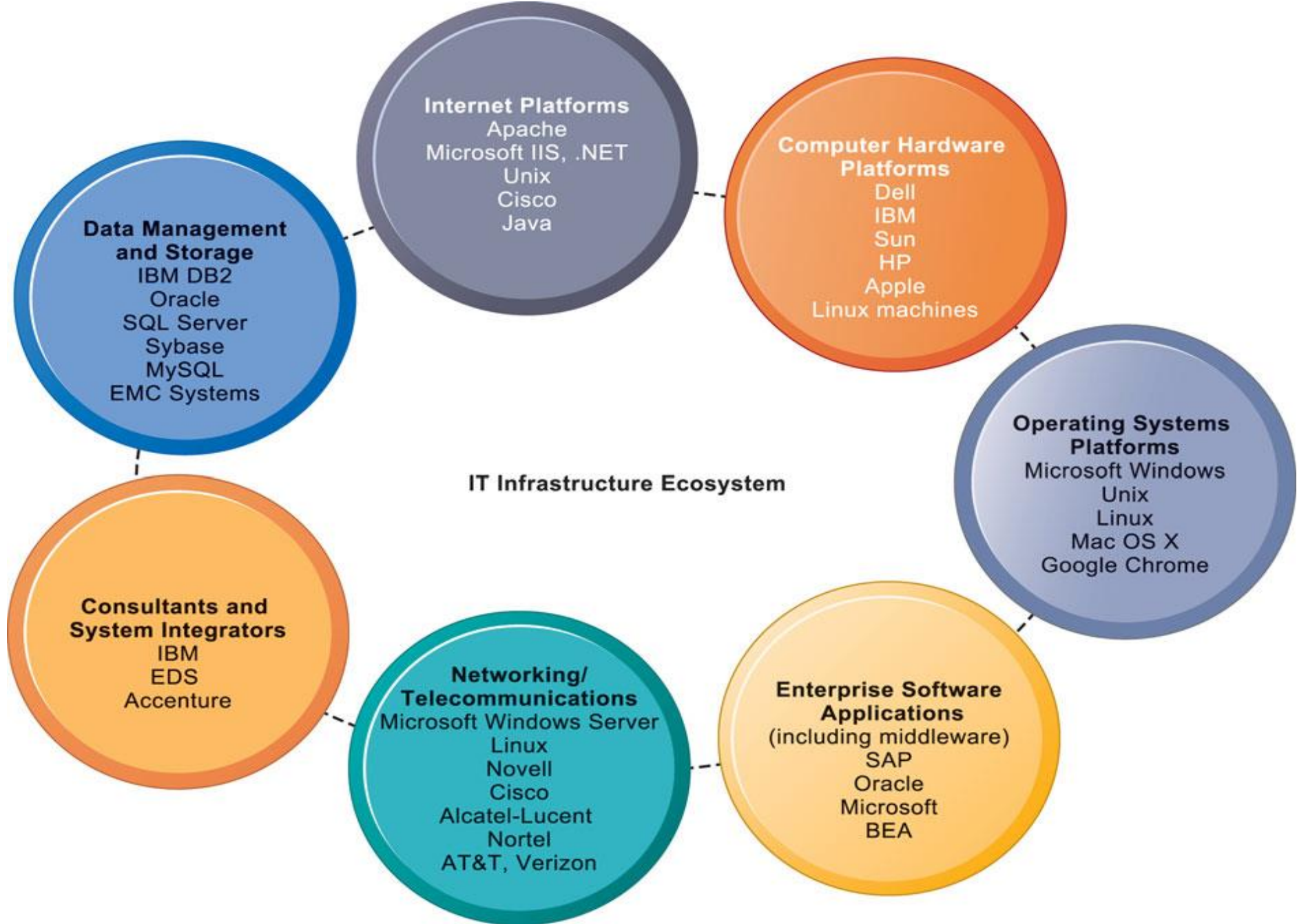


Figure: The IT infrastructure ecosystem

1. COMPUTER HARDWARE PLATFORMS

- Client machines and server machines
- The server market uses mostly Intel or AMD processors in the form of blade servers in racks
- Less space than traditional box-based servers
- Top firms: IBM, HP, Dell, and Sun Microsystems
- Three chip producers: Intel, AMD, and IBM

2. OPERATING SYSTEM PLATFORMS

- Microsoft Windows comprises about 75 percent of the server operating system market
- 25 percent of corporate servers using some form of the **Unix** operating system or **Linux**
- Unix and Linux are scalable, reliable, and much less expensive than mainframe operating systems.
- 90 percent of PCs use some form of Microsoft Windows **operating system**
- Google's **Chrome OS** provides a lightweight operating system for cloud computing
- **Android** is a mobile operating system.

3. ENTERPRISE SOFTWARE APPLICATIONS

- Span functional areas, focus on executing business processes across the business firm, and include all levels of management.
- Businesses become **more flexible and productive**.
- Four major enterprise applications:
 - enterprise systems,
 - supply chain management systems,
 - customer relationship management systems, and
 - knowledge management systems.
- SAP and Oracle

4. DATA MANAGEMENT AND STORAGE

- Responsible for organizing and managing the firm's data
- Efficiently accessed and used
- IBM (DB2),
- Oracle,
- Microsoft (SQL Server), and
- Sybase (Adaptive Server Enterprise)
- Large firms are turning to network-based storage technologies
- **Storage area networks (SANs):** connect multiple storage devices on a separate high-speed network dedicated to storage

5. NETWORKING/TELECOMMUNICATIONS PLATFORMS

- Large enterprise wide area networks primarily use some variant of Unix.
- Most local area networks use the TCP/IP protocol suite
- The leading networking hardware providers are Cisco, Alcatel-Lucent, Nortel, and Juniper Networks
- Telecommunications services:
 - voice and data connectivity,
 - wide area networking,
 - wireless services, and
 - internet access

6. INTERNET PLATFORMS

- Relate to, the firm's general networking infrastructure and hardware and software platforms
- Web hosting services, routers, and cabling or wireless equipment
 - Microsoft (Microsoft Expression Web, SharePoint Designer, and the Microsoft .NET family of development tools);
 - Oracle-Sun (Sun's Java is the most widely used tool for developing interactive Web applications on both the server and client sides); and
 - A host of independent software developers, including Adobe (Flash and text tools like Acrobat), and Real Media (media software)

7. CONSULTING AND SYSTEM INTEGRATION SERVICES

- Does not have the staff, the skills, the budget, or the necessary experience
- Significant changes in business processes and procedures, training and education, and software integration
- Leading consulting firms:
 - Accenture,
 - IBM Global Services,
 - HP Enterprise Services,
 - Infosys, and
 - Wipro Technologies.

CONTEMPORARY HARDWARE PLATFORM TRENDS

- Dramatically changed how businesses organize their computing power, putting more of this power on networks and mobile handheld devices.
- Seven hardware trends:
 1. The emerging mobile digital platform,
 2. grid computing,
 3. virtualization,
 4. cloud computing,
 5. green computing,
 6. high-performance/powersaving processors, and
 7. autonomic computing.

1. THE EMERGING MOBILE DIGITAL PLATFORM

- **Alternatives to PCs and larger computers**
- **Cell phones and smartphones:** transmission of data, surfing the Web, transmitting e-mail and instant messages, displaying digital content, and exchanging data with internal corporate systems
- **Netbooks:** optimized for wireless communication and Internet access
- **Accessing the Internet,** with business computing moving increasingly from PCs and desktop machines to these mobile devices

2. GRID COMPUTING

- Connects geographically remote computers into a single network to create a virtual supercomputer
- Requires software programs to control and allocate resources on the grid
- **Cost savings, speed of computation, and agility**

3. VIRTUALIZATION

- The process of presenting a set of computing resources
- Not restricted by physical configuration or geographic location
- A single physical to appear to the user as multiple logical resources
- Enables multiple physical resources to appear as a single logical resource
- **VMware**

4. CLOUD COMPUTING

- Computer processing, storage, software, and other services as a pool of virtualized resources over a network
- **On-demand self-service:** Individuals can obtain computing capabilities such as server time or network storage on their own.
- **Ubiquitous network access:** Individuals can use standard network and Internet devices, including mobile platforms, to access cloud resources.
- **Location independent resource pooling:** Computing resources are pooled to serve multiple users, with different virtual resources dynamically assigned according to user demand. The user generally does not know where the computing resources are located.
- **Rapid elasticity:** Computing resources can be rapidly provisioned, increased, or decreased to meet changing user demand.
- **Measured service:** Charges for cloud resources are based on amount of resources actually used.

4. CLOUD COMPUTING (CONT.)

- Cloud computing consists of three different types of services:
 - 1. Cloud infrastructure as a service:** Customers use processing, storage, networking, and other computing resources from cloud service providers to run their information systems.
 - 2. Cloud platform as a service:** Customers use infrastructure and programming tools hosted by the service provider to develop their own applications.
 - 3. Cloud software as a service:** Customers use software hosted by the vendor on the vendor's hardware and delivered over a network

5. GREEN COMPUTING

- Practices and technologies for designing, manufacturing, using, and disposing of computers, servers, and associated devices
- **Reducing computer power consumption** has been a very high “green” priority.
- Cutting power consumption in data centers has become both a serious business and environmental challenge.

6. AUTONOMIC COMPUTING

- With large systems, many thousands of networked devices, may not be manageable
- To employ autonomic computing
- An industry-wide effort to develop systems that can configure themselves, optimize and tune themselves, heal themselves when broken, and protect themselves from outside intruders and self-destruction
- Virus and firewall protection software, able to detect viruses on PCs, automatically defeat the viruses, and alert operators, updated automatically

7. HIGH-PERFORMANCE AND POWER-SAVING PROCESSORS

- To **reduce power requirements and hardware sprawl**
- A **multicore processor**: enhanced performance, reduced power consumption, and more efficient simultaneous processing of multiple tasks.
- Low power consumption is essential for prolonging battery life in smartphones, netbooks, and other mobile digital devices.
- Power-efficient microprocessors:
 - ARM,
 - Apple's A4 processor, and
 - Intel's Atom in netbooks, digital media players, and smartphones.

CONTEMPORARY SOFTWARE PLATFORM TRENDS

- Four major themes in contemporary software platform evolution:
 1. Linux and open source software
 2. Java and Ajax
 3. Web services and service-oriented architecture
 4. Software outsourcing and cloud services

1. LINUX AND OPEN SOURCE SOFTWARE

- **Open source software:** software produced by a community of several hundred thousand programmers around the world
- **Free and can be modified by users**
- **Not restricted** to any specific operating system or hardware technology
- Popular open source software tools include the Linux operating system, the Apache HTTP Web server, the Mozilla Firefox Web browser, and the Oracle Open Office desktop productivity suite

2. JAVA AND AJAX

Java

- An operating system-independent, processor-independent, object-oriented programming language
- Created by James Gosling and the Green Team at Sun Microsystems in 1992
- Migrated into cellular phones, smartphones, automobiles, music players, game machines, and set-top cable television systems

Ajax

- Web development technique for creating interactive Web applications
- Allows a client and server to exchange small pieces of data behind the scene so that an entire Web page does not have to be reloaded each time
- Uses JavaScript programs

3. WEB SERVICES AND SERVICE-ORIENTED ARCHITECTURE

- Exchange information with each other using universal Web communication standards and languages
- Regardless of the operating systems or programming languages
- Used to build open standard Web-based applications linking systems of two different organizations
- Without time-consuming custom coding
- XML (Extensible Markup Language)
- Hypertext Markup Language (HTML)

4. SOFTWARE OUTSOURCING AND CLOUD SERVICES

- Continue to operate legacy systems that continue to meet a business need
- Purchase or rent most of their new software applications **from external sources**
- Three external sources for software:
 - software packages from a commercial software vendor,
 - outsourcing custom application development to an external vendor, and
 - cloud-based software services and tools.

MANAGEMENT ISSUES

- **Creating and managing a coherent IT infrastructure raises multiple challenges:**
 - dealing with platform and technology change (including cloud and mobile computing),
 - management and governance, and
 - making wise infrastructure investments.

ASSESSMENT

1. What is IT infrastructure and what are its components?
2. What are the stages and technology drivers of IT infrastructure evolution?
3. What are the current trends in computer hardware platforms?
4. What are the current trends in software platforms?
5. What are the challenges of managing IT infrastructure and management solutions?

**Next Week Lecture: Telecommunications,
the Internet, and Wireless Technology**

THANK YOU.