Lesson 1: Introduction and Overview

Overview and Objectives

Lesson 1 provides an overview of the course. You will explore the nature of mobile computing as well as the challenges and opportunities presented by mobile commerce.

Learning Objectives

After completing this lesson, you will be able to

1. describe the multifaceted nature of mobile computing and wireless systems.

2. identify the range of mobile computing applications presently available and being developed.

3. explain the use of middleware to smooth over mobile and wireless computing issues in order that the same applications can run on wired as well as wireless networks.

4. list the different types of wireless networks and describe how they transmit/receive information by using different signal encoding, modulation, and error detection/correction schemes.

5. explain why wireless security is a major concern and describe how it can be a deterrent to implementing mission-critical wireless applications.

6. list the range of management issues and business opportunities that exist in mobile business.

Learning Activities

Readings

- [Lesson 1 Summary Notes](#)

- Umar (2010), Chapter 1: *Overview and the Big Picture*
  o Section 1.2: Strengths and Weaknesses of Wireless
  o Section 1.4: Mobile Business, Mobile Government and Mobile Life
  o Section 1.5: Mobile Computing Applications: Supporting m-Business and m-Government
  o Section 1.6: Platforms to Support Mobile Computing Applications
  o Section 1.7: Overview of Wireless Networks
  o Subsection 1.8.2: Wireless Security

Cases

- Umar (2010), Section 1.11: *Short Examples and Case Studies*
  o Read Case 1.11.1: UPS Uses Wireless Communications

o Read Case 1.11.2: Sample m-Business and m-Government Initiatives
o Read Case 1.11.3: Sample Wireless Internet Services

Discussion

In the Lesson 1 discussion forum,

- choose **one** question from among the following and post your response:
  o any question in Chapter 1, Section 1.13 in Umar (2010)

- then, comment on another student's response.
  and
- answer any questions posed to you.

Summary Notes

Strengths and Weaknesses of Wireless

Several strengths are driving the growth of wireless systems, including

- social and cultural factors related to our mobile environment and lifestyles
- advances in wireless networks
- niche applications (e.g., space exploration)
- special situations (e.g., hard-to-reach places)
- older buildings that cannot be wired or re-wired
- new developments in mobile devices
- possibility for increased revenue and productivity
- industrial and regulatory factors.

Wireless systems also have some weaknesses, including security management, lack of industry-wide standards, data rate limitations, and device limitations. The weaknesses can be summarized as social issues, business issues, and technology issues.

Mobile Business, Mobile Government and Mobile Life

The evolution of e-business has followed four stages, from basic websites, to basic e-commerce, then to e-business, and finally next-generation enterprises (NGE) also known as mobile business. Mobile government, a subset of e-government, uses information communication technologies (ICTs) to make services available anytime and anywhere. Such services include

- citizen to government (C2G)
- business to government (B2G)
- m-transactions
- m-voting and m-administration.

Mobile life, when abbreviated to mLife, is a project proposed by AT&T. According to AT&T, the "m" in mLife not only represents mobile, but also messaging, multitasking, modern, and managed.

Mobile Computing Applications: Supporting m-Business and m-Government

Most mobile computing applications are not new; rather they are extensions of existing (wired) applications. Umar (2010) divides mobile computing applications into several categories, including

- wireless messaging services
- wireless websites and m-portals
- mobile commerce (and its various types of forms)
- mobile customer relationship management systems (m-CRM)
- mobile supply chain management systems (m-SCM)
- specialized m-applications such as m-voting, wireless sensor networks, and location-based services.

Platforms to Support Mobile Computing Applications

Mobile computing platforms "provide the unique services needed by mobile computing applications" (Umar (2010), p. 1-50). There are three types of services, including

- local platform services (e.g., operating systems and database managers)
- network transport services (e.g., network protocols and message routing services)
- middleware services to interconnect mobile users, databases, and applications.

Overview of Wireless Networks

The unique features of wireless networks include

- government regulations restrict bandwidths, and government policies restrict wireless communications to a few frequency ranges

- communication between sender and receiver is often subject to noise, interference, and problems resulting from weather

- senders' and receivers' locations are unknown and can be changed during communication.

Wireless networks are classified into three types according to the distance they can cover:

- Wireless Local Area Networks (WLANs) cover less than 100 metres.
- Wireless Metropolitan Area Networks (WMANs) cover several kilometres.
- Wireless Wide Area Networks (WWANs) can cover very long distances via cellular networks and satellite systems.

Wireless Security

There are a number of security issues associated with wireless networks, including

- privacy
- integrity of information
- authentication
- authorization (access control)
- accountability and assurance.

Security is needed at different levels, namely wireless link, TCP/IP, middleware, and application levels. There are solutions for security at each level. See Figure 1-17 (Umar (2010), pp. 1–68) for examples.

Review Activities

Complete the following review activities. Contact the Student Support Centre to clarify any learning difficulties or issues.

- Be sure you know the meaning and significance of the key terms for this lesson before proceeding to the next lesson. Try the following interactive exercises to test your understanding of the key terms used in this lesson.

- Provide written answers to the following review questions in a notebook or on your computer, then compare your responses to the suggested answers on the next page.

  1. What strengths are driving the growth of wireless systems?

  2. Discuss the weaknesses of wireless systems in terms of social, business, and technology issues.

  3. Use an equation to represent m-Business.

  4. What is Next-Generation Enterprise (NGE)?

  5. List three mobile computing applications, and explain their support to mobile business and m-government.

  6. Describe wireless middleware and its functions.

  7. Briefly describe the classification of wireless networks and list an example for each kind of wireless network.

  8. What does PIA4 stands for? Briefly explain each aspect.

  9. Describe the technologies used to protect data transmission at the wireless link level, and at higher (TCP/IP), middleware, and application levels.

Lesson 2: Mobile Computing Applications

Overview and Objectives

Lesson 2 explores the integration of mobile computing applications into web-based activities.

Learning Objectives

After completing this lesson, you will be able to

1. explain how mobile computing applications support m-business, m-government, and mobile life initiatives.

2. explain how most mobile computing applications are not fundamentally new applications; rather, mobile device access over wireless networks is another aspect (dimension) of most existing applications.

3. discuss how mobile IP allows mobile devices (e.g., smartphones, portable computers) to maintain Internet connectivity while moving from one Internet attachment point to another.

4. explain how wireless gateways are used to connect wireless devices to web servers.

5. discuss the next-generation Web (also known as Semantic Web) and explain how it automates the Web through extended markup language (XML) and its variants that can describe semi-structured information for automation and metadata.

6. explain how Web Services (WS) provide global distributed applications and how Mobile Web Services is a specification that describes how WS can be used to accommodate mobile devices.