Mobile Communication – An overview

Lesson 08
Mobile Computing Architecture
Mobile computing Architecture

- Programming languages used for mobile system software
- Operating system functions to run the software components onto the hardware
- Middleware components deployment
Mobile computing Architecture

- Layered structure arrangement of mobile computing components
- Protocols and layers used for transmission and reception
Programming Languages

- Java— J2SE.
- J2ME (Java2 Micro edition)
- JavaCard (Java for smart card)
- The Java enterprise edition (J2EE) used for web and enterprise server based applications of mobile services
Programming Languages

- C and C++
- Visual C++
- Visual Basic.
Operating System

• Symbian OS, Window CE, Mac OS…
• Offers the user to run an application without considering the hardware specifications and functionalities
• Provides functions which are used for scheduling the multiple tasks in a system
Operating System

- Provides the functions required for the synchronization of multiple tasks in the system
- Multiple threads synchronization and priority allocation
- Management functions (such as creation, activation, deletion, suspension, and delay) for tasks and memory
Operating System

- Provides Interfaces for communication between software components at the application layer, middleware layers, and hardware devices.
- Facilitates execution of software components on diversified hardware.
- Provides Configurable libraries for the GUI (graphic user interface) in the device.
Operating System

- Provides User application’s GUIs, VUI (voice user interface) components, and phone API
- Provides the device drivers for the keyboard, display, USB, and other devices
Middleware for Mobile Systems

- Software components that link the application components with the network-distributed components
- To discover the nearby device such as Bluetooth
- To discover the nearby hot spot
Middleware for Mobile Systems

- For achieving device synchronization with the server or an enterprise server
- For retrieving data (which may be in Oracle or DB2) from a network database
- For service discovery at network
- For adaptation of the application to the platform and service availability
Mobile Computing Architectural Layers

Client application

Communication APIs (e-mail, Internet, SMS, MMS, PIM, Bluetooth, security, communication protocol)

GUI API

Phone API

Middleware components: service-discovery, device management, network database components, etc.

Operating system

Device hardware consisting of display device, keypad, RAM, flash, embedded processor, media processor

Radio interface, gateway, and network interface

Network
Mobile computing services

Protocols

• Such as GSM 900, GSM900/1800/1900, UMTS, and I-Mode
• WPAN protocols—Bluetooth, IrDA, and Zigbee)
• WLAN protocols—for example, 802.11a and 802.11b)
• WAP
Mobile Computing system Layers

1. Physical for sending and receiving signals (for example, TDMA or CDMA coding)
2. Data-link (for example, multiplexing)
3. Networking (for linking to the destination)
Mobile Computing system Layers

4. Wireless transport layer security (for establishing end-to-end connectivity)
5. Wireless transaction protocol
6. Wireless session protocol
7. Wireless application environment (for running a web application, for example, mobile e-business)
Summary

- Mobile Computing Programming languages—Java, J2ME, C/C++, Visual Basic, visual C++
- OS—Symbian OS, Window CE, Mac OS
- Middleware components
- Architecture software layers
- Protocols layers
- Network Layers
End of Lesson 08
Mobile Computing Architecture