Nadar Saraswathi College of Engineering & Technology

NSCET E-LEARNING PRESENTATION

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COMPUTER SCIENCE AND ENGINEERING

III YEAR / VI SEMESTER

CS8601 – MOBILE COMPUTING

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UNIT 05

Mobile Platforms and Applications

Mobile Platforms and Applications-Overview

- Mobile Device Operating Systems
- Special Constraints & Requirements
- Commercial Mobile Operating Systems
- Software Development Kit
    - iOS, Android >- BlackBerry, Windows Phone
- M-Commerce
    - Structure >- Pros & Cons.
- Mobile Payment System
- Security Issues.

Lecture 01- Mobile Device Operating Systems

- Grown user needs and technology plays vital role in a development of internet and depended systems.
- Smart phones are essential requirement that is targeted to every user must have access to day-to-day things in technology.
- Two types of phones
  - Feature phone
  - Smart phone
- Smartphone requires an operating system and it must have some responsibilities too.

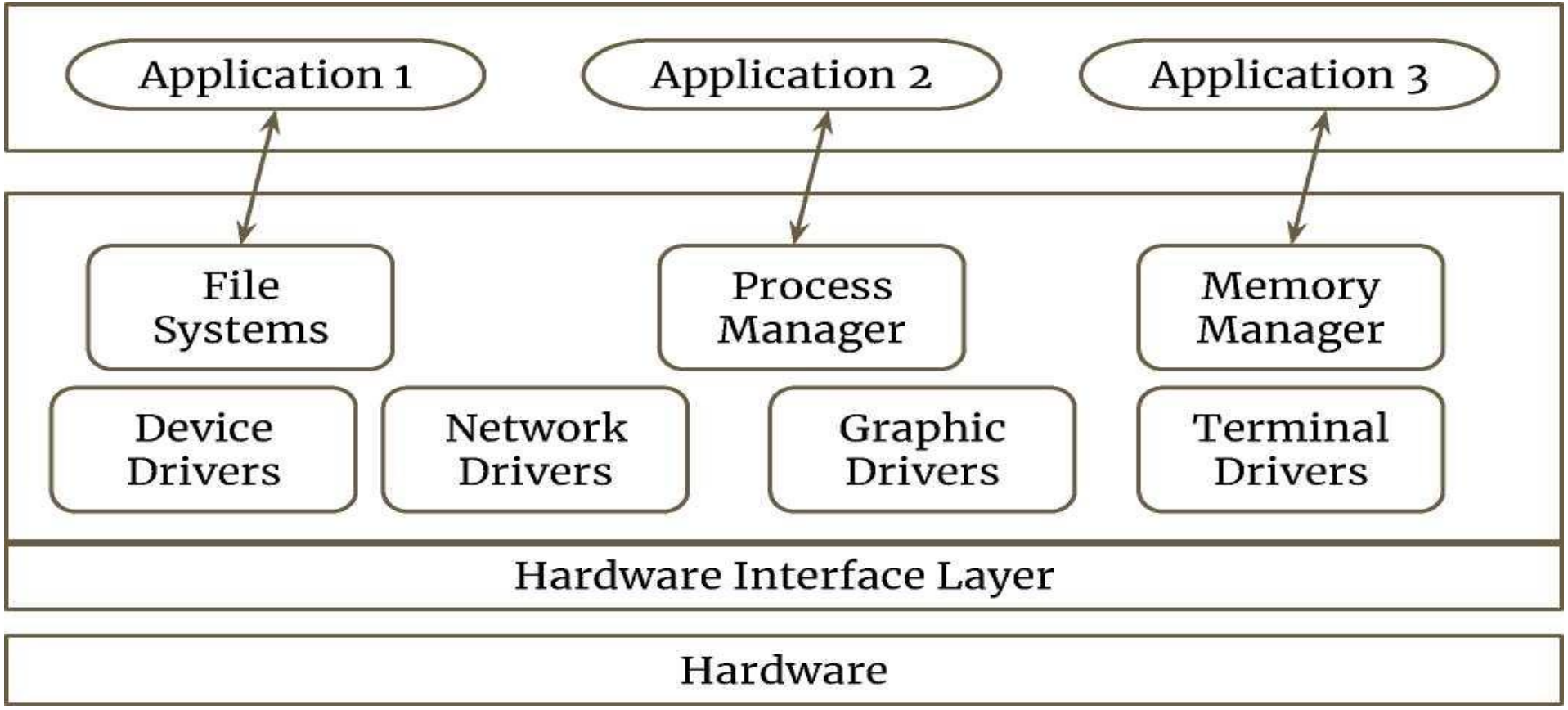
Operating System Responsibilities

- Managing Resources
  - Efficient use of resources and devices by multiple tasking.
  - OS must manage multiple devices.
    - Processor, RAM, Storage, Camera, Speaker, Keyboard and Screen.
  - OS must run multiple applications at a same time that applications contains multiple threads.
- Providing Different Interface
  - OS must able to handle Interactive interface as well network interface.
  - Must able communicate with mobile network at the same time it must interact with user too.

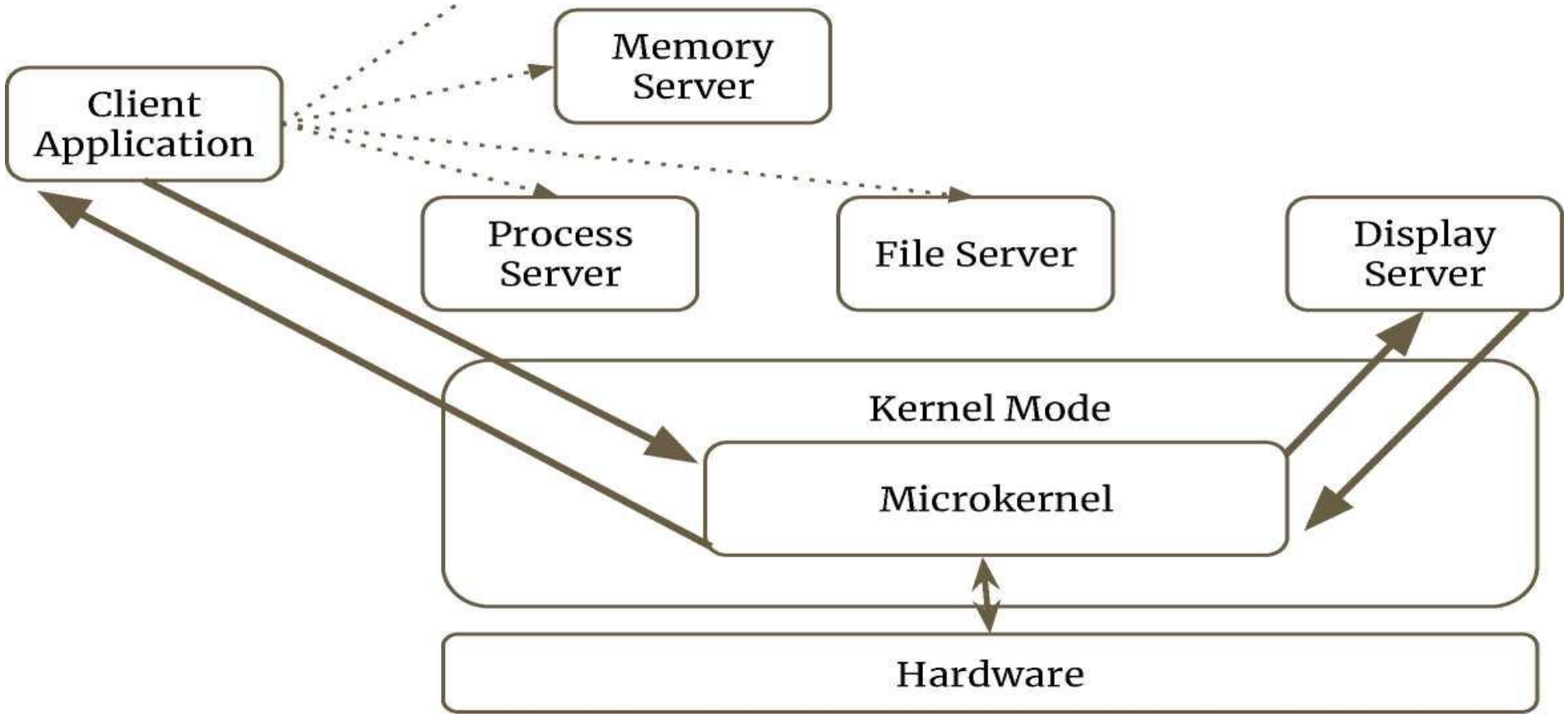
Mobile Operating System

- OS must have 2 parts Kernel and Shell.
  - Kernel is core that actually interacts with hardware.
- Kernel Types:
  - Monolithic Kernel.
  - Microkernel.
- Two mode of Operations
  - Kernel Mode.
  - User Mode.

Monolithic Kernel



Microkernel



Lecture 02

Special Constraints and Requirements of Mobile Operating System

What we need to consider?

- Power
- Frequent low power sleep mode.
- Mobile need to be booted much faster.
- Small size kernel.

Special Constraints and Requirements of Mobile Operating System

Special Constraints

- Limited Memory.
- Limited Screen Size.
- Miniature keyboard.
- Limited processing power.
- Limited battery power.
- Limited and fluctuating bandwidth of the wireless medium.

Special Constraints and Requirements of Mobile Operating System

Miniature Key Board

- Use of small size keyboard and stylus.
- Typing is too difficult for large document creation
- We need auto completion option.
- Free form writing and handwriting recognition.

Limited Processing Power

- ARM - Based processor.
- It is energy efficient, cheaper, powerful.
- It is slower processor.
- Size of on-chip memory is restricted.
- So the development is carried out outside.

Special Constraints and Requirements of Mobile Operating System

Limited Battery Power

- Mobile need to lightweight and portable so we need to use slim batteries.
- No frequent recharges.
- OS needs to be computationally efficient and minimum power consumption.
- Putting processor and display into sleep mode when it is not needed.

Special Constraints and Requirements of Mobile Operating System

Limited and Fluctuating bandwidth of the wireless medium

- Mobile need to run complex protocols caused by mobility and wireless medium.
- Medium is directly prone to noise leads to bit-errors rates.
- Bandwidth may fluctuate due to noise, mobility of the node and obstacles.
- This show up with short-term fades.
- Longer disconnections due to handoffs.
- Uninterrupted communication requires special support like data caching, pre-fetching and integration.

Special Constraints and Requirements of Mobile Operating System

Special Requirements

- Support for specific communication protocols.
- Support for variety of input mechanisms.
- Compliance with open standards.
- Extensive library support.

Lecture-02 Commercial Mobile Operating Systems

IBM Simon

Multifunctional phone

- Features
  - E-Mails.
  - Fax.
  - Cellular pages.
- Applications
  - Address book >- Calendar
  - >- Appointment Scheduler.
  - >- World time clock.
  - >- Electronic note pad >- Stylus input for keyboard.
- OS is ROM-DOS with file Staker

Commercial Mobile Operating Systems

Palm OS (Palm Pilot 1000)

- It is PDA and Phone that uses the motorola processor of 16 Mhz with 256 Kb or 512 Kb of Built in RAM.

Features

- Monochrome LCD Panels with Handwriting Recognition.

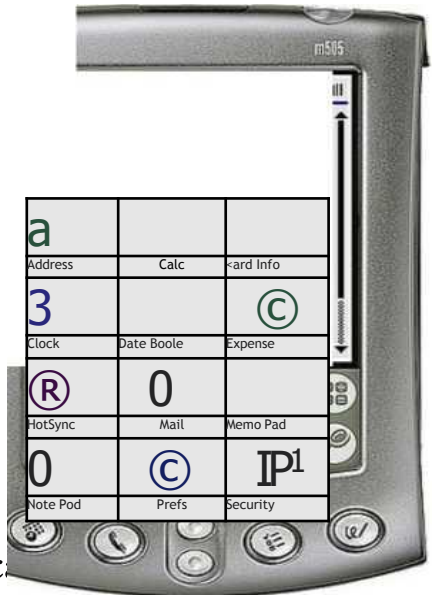
Applications

- Date Book
- Address Book
- To Do List
- Memo Pad

- It uses the palm OS.

Commercial Mobile Operating Systems

Palm OS



- Simple, single-tasking environment to allow launching of full
- screen applications with a basic, common GUI set
- Monochrome or color screens with resolutions up to 480x320 pixel
- Handwriting recognition input system called Graffiti 2
- HotSync technology for data synchronization with desktop computers
- Sound playback and record capabilities
- Simple security model: Device can be locked by password, arbitrary application records c
  TCP/IP network access
- Serial port/USB, infrared, Bluetooth and Wi-Fi connections Expansion memory card support
- Defined standard data format for personal information management applications to store calendar, address, task and note entries, accessible by third-party applications.

Commercial Mobile Operating Systems

Windows Embedded Compact (Windows CE)

- Os developed by Microsoft.
- It uses the hybrid kernel.
- Optimized kernel runs on l MB of Memory.
- Platforms

- AutoPC
- Pocket PC 2000
- Pocket PC 2002
- Windows Mobile 2003
- Windows Mobile 2003 SE
- Windows Mobile 5
- Windows Mobile 6
- Smartphone 2002
- Smartphone 2003
- Portable Media Center
- Zune and Now Windows Phone

Commercial Mobile Operating Systems

Symbian OS

- Developed by Nokia, Samsung, Ericsson, Panasonic.
- In 2008 it will acquired fully by nokia.
- After the launch of android by google then symbian become open source under Eclipse Public License (EPL).
- In 2011 nokia moves from symbian to windows phone.
- Symbian is a mobile OS that,
- Real time, Multitasking, Preemptive, 32 bit OS runs on ARM processors.
- It is microkernel based.
- Flavours of symbian (Series 60, UIQInterface)

Commercial Mobile Operating Systems

Symbian OS

- It supports communication protocols like TCP, UDP, PPP, DNS, FTP, WAP.
- It supports Bluetooth, InfraRed, USB Connectivity.
- Low power mode of CPU switch available.
- Low on power and memory requirement applications (OOPS) based.
- Event based applications run by active objects.
- Carbide is an IDE supports for C+ + development.
- Eclipse plug-in is available for development.

Commercial Mobile Operating Systems

Android OS

- Google ' s operating system.
- Open source.
- Features
  - Phone based keyboard or touch screen for input.
  - Has built-in web browser that renders the web page fully.
  - Easy way to develop third party applications.
  - Android SDK and Eclipse.
  - Provides RDBMS SQLite for data storage.
  - Pre installed applications such as Gmail, Maps, Voice-Search, etc

Commercial Mobile Operating Systems

Android OS

- Application Layer
  - Web browser, Email client, SMS Manager, Maps.
  - Apps written in J2ME.
  - No priority control to manage resources aggressively.
- Application Framework
  - Used to implement standard structure for apps.
  - It provides the set of services that can used by developers.
  - Services
    - Managers (For events)
    - Content providers (For accessing data)

Commercial Mobile Operating Systems

Android OS

Libraries and Runtime

- It is written in multiple languages including C and C+ + and called through JAVA interfaces.
- It includes surface managers (for compositing windows) 2D and 3D graphics, Media codecs (MP4, MP3) an SQL database SQLite.
- It includes web browser engine called webkit.

Runtime

- Core libraries
- Dalvik virtual machine

DVM converts the java code into native ARM code.

- Each Application runs as own process with own instance of Dalvik virtual machine (DVM).

Commercial Mobile Operating Systems

Android OS

- Kernel
- It is based on Linux kernel.
- Excluded native X windows of GNU.
- Android implements it's own
  - Device drivers
  - Memory management
  - Process management
    - Networking functionalities >- Runs the application concurrently
- Google initially maintains the kernel code and contributed to linux public distribution.
- Now google no longer maintains the kernel extensions.

Commercial Mobile Operating Systems

iOS (Apple)

- Apple developed iOS for iPhone the direct replacement for iPod.
- It is derivative of Mac OS.
- It is property and maintained apple.
- Market shots,

Features

- Swipe
- Tap >- Pinch
- Reverse Pinch
- It includes internal accelerometer for recognize the shake and change the music.
- Display mode switch portrait to landscape and vise

Lecture 03

Software Development Kits

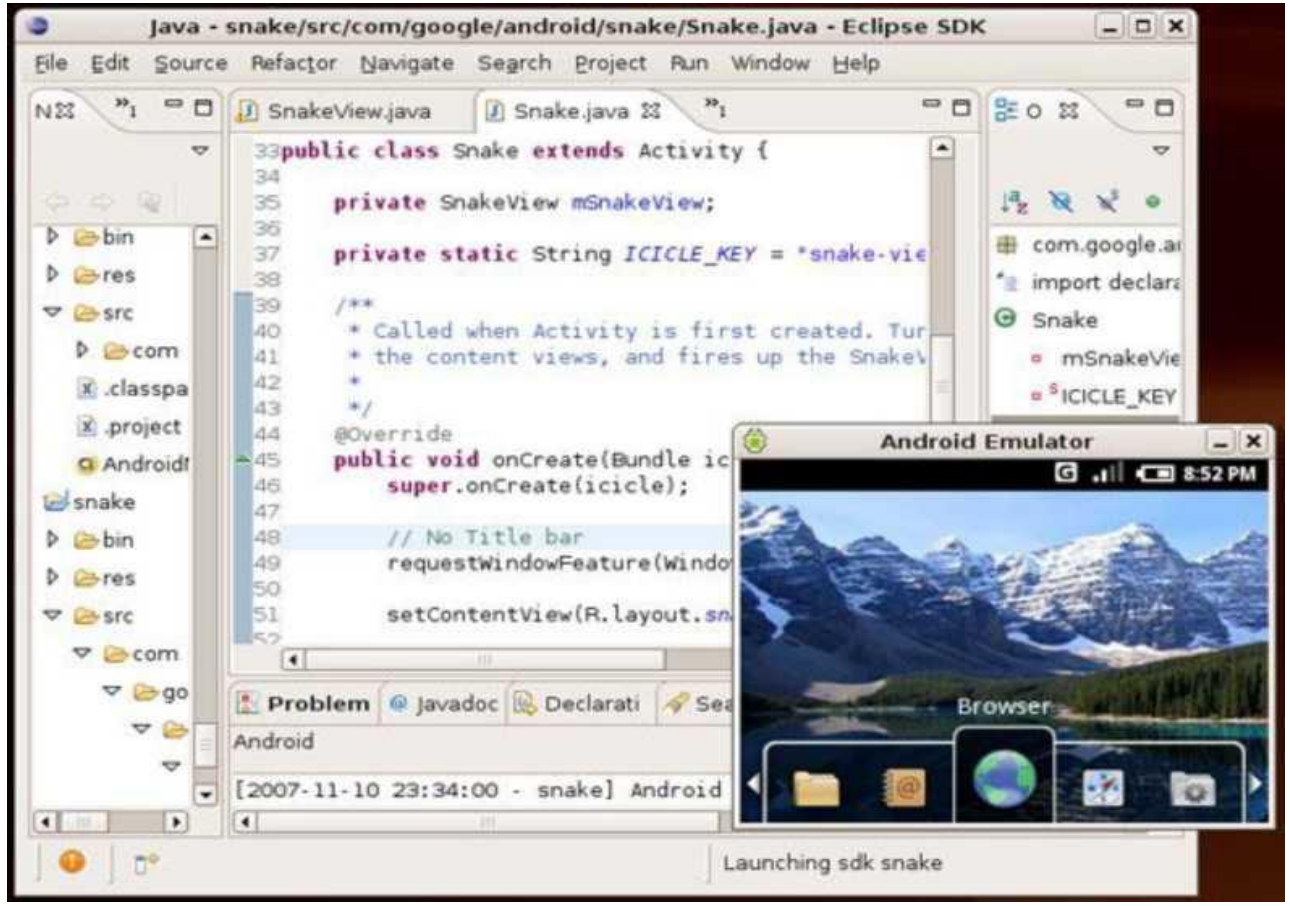
A software development kit (SDK or devkit) is typically a set of software development tools that allows the creation of applications for a certain software package, software framework, hardware platform, computer system, video game console, operating system, or similar development platform.

Software Development Kits

Android SDK

- Package Contains
  - Android SDK, IDE for development (Eclipse or Android Studio)
  - Virtual Machine Manager and System Images to Boot the emulators.
  - Tools to debug the apps during developments.
  - Builders for Development (Ant for Eclipse and Gradle for Android Studio).
- Android Application Components
  - Activity.
  - Services.
  - Broadcast receivers

Software Development Kits-Android SDK



Software Development Kits

iOS SDK

- Developed by Apple Inc.
- Package contains
  - Development IDE.
  - Iphone Simulator.
  - Applications written in Swift and Objective - C.
  - Some elements of application developed using C and C
- Cocoa Touch
  - Multi-touch events and controls >- Accelerometer support >- View hierarchy >- Localization (ii8n)
  - Camera support

Software Development Kits-iOS SDK

- Media
  - OpenAL
  - Audio mixing and recording >- Video playback >- Image file formats >- Quartz >- Core Animation >- OpenGL ES
- Core Services
  - Networking
  - Embedded SQLite database
  - Core Location
  - Threads
  - CoreMotion

M-Commerce (Mobile Commerce)

- M-commerce (mobile commerce) is the buying and selling of goods and services through wireless handheld devices such as cellular telephone and personal digital assistants (PDAs). Known as next-generation e-commerce, m-commerce enables users to access the Internet without needing to find a place to plug in.
- Applications of M-Commerce

M-commerce applications can be broadly categorized into two

- Business-to-Consumer (B2C).
- Business-to-Business (B2B).

Business-to-Consumer Applications (B2C)

Business-to-Consumer is a form of commerce in which products services are sold by a business firm to a consumer.

- Advertising
- Comparison shopping
- Information about a product
- Mobile Ticketing
- Loyalty and payment service
- Interactive advertisements
- Catalogue shopping

Business-to-Consumer Applications (B2C)

Advertising

- Location based advertising.
- Purchase track will give you the information about future buy's of same customer.

Comparison shopping

- Pricing analysis with different shops.
- Feature analysis with different products and brands.
- Quality of service can be improved by customers reviews.

Information about a product

- Consumers can know more about what they buy.
- Pharmacy and dosage information about the trucks.

Business-to-Consumer Applications (B2C)

Mobile Ticketing

- We can buy M-Tickets using credit cards.
- Purchase confirmation can be sent through SMS or e-mail.
- Train, Movie, Bus, etc.

Loyalty and payment services

- Payback cards
- Points will be generated according to the user buy's.
- According to points user earns they may avail special gifts

Interactive advertisements

- Offers through the TV and Teleshopping

Catalogue shopping

- >- Direct buy using direct link sent by company.

Business-to-Consumer Applications (B2C)

Ordering and delivery confirmation

- Mobile phones can be used by the dealers to order products.
- Mobile phones can be used to gather information about the status of consignments during the transport and delivery process.
- Realtime consignment tracking.

Stock tracking and control

- Mobile tracking can be connected with inventory of store.
- It can track warehouse status.

Supply Chain Management (SCM).

Mobile inventory management

Lecture 05

Mobile Payment Systems

- Mobile payment (M-Payment) is defined as any payment instrument where a mobile device is used to initiate, authorize and conform an exchange of financial value in return for goods and services.

Devices used for,

- Mobile phones.
- Personal Digital Assistants (PDA).

Mobile Payment Schemes

Three popular types of M-Payment schemes are currently being used:

- Bank account based.
- Credit card based.
- Micropayment.

- Each payment scheme uses customer's banking information the service provider may charge small amount.

Mobile Payment Schemes

Bank account based M-payment

- The bank account number is linked to customer's mobile number.
- Customer may make a transactions with vendor, based on the Bluetooth or wireless LAN connectivity with vendor.
- The bank account of the customer is debited and the value is credited to the vendor's account.
- M-Chek is linking credit or debit card with customer's mobile number.

Mobile Payment Schemes

Credit card based M-Payment

- The credit card number is linked with mobile number.
- When a customer makes a transactions with merchant, credit card is charged and the value is added merchant's account.

Micropayment

- It is intended for payment for small purchases such as vending machines.
- Mobile can connect with blue tooth and wireless LAN connect to make payment.

Lecture-06

M-Commerce Security Issues

- Privacy Risks.
- Mobile devices difficult to find on the move.
- Mobile devices go online and offline frequently.
- Attacks would be very difficult to trace.
- Risk of mobile loss and theft.
- Fraud payment from stolen mobile is more difficult to track.
- Lack of any satisfactory mechanism to authenticate a particular user.

THANK YOU