**A**

**Seminar Report**

**on**

# MOBILE COMPUTING

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# CERTIFICATE

This is to certify that work presented in the seminar entitled **"Mobile Computing"** has been carried out by **Pansuriya Dip B.** with **Enrollment Number: 10012011051** under my guidance as partial fulfillment of requirements to award Bachelor of Technology in Computer Engineering by Ganpat University, Kherva, Mahesana.

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# ACKNOWLEDGEMENT

We feel great pleasure in submitting this report as a part of our 5th semester project. This report is prepared on the bases of education taken at **U.V.PATEL COLLEGE OF ENGINEERING.**

We offer our sincere gratitude to the **DEPARTMENT OF COMPUTER ENGINEERING, U.V. PATEL COLLEGE OF ENGINEERING** for giving us such a wonderful opportunity.

First of all, we express our thank to **(Head Of Computer Engineering Department) Prof. Kiran Amin** for granting us the permission to access the college facilities effectively.

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With Sincere regards from,
Pasuriya Dip B.

# ABSTRACT

Wireless communications are being driven by the need for providing network access to mobile or nomadic computing devices. The need for wireless access to a network is evident in current work environments. The wireless technologies are an active area of research and applications.

These technologies of wireless networking may save you from physical hassle connecting computer hardware but with consideration of standards, installation and security. Combine wireless “anything“ with the daily activities and challenges of your business and understand the difficulties that have to be faced every day. In this paper, different wireless technologies like Bluetooth, Wi Fi etc are discussed

The technology integration has two aspects, namely, the integration of the same technology from different parts of the world, and secondly, the integration of different technologies in the same country. Future generations of wireless communication systems, such as fourth generation (4G) mobile communication systems, broadband wireless access networks are expected to provide a wide variety of services (e.g. multimedia, broadcasting, etc.) through reliable high data rate wireless channels.

The high data rate wireless channel can be obtained with wide signal bandwidth in high frequency bands such as microwave ka-band and millimeter wave. Recently smart antennas have been proposed as a promising solution that can significantly increase the data rate and improve the quality of wireless transmission which is limited by interference, local scattering, and multipath propagation

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# CHAPTER : 1

# HISTORY OF WIRELESS COMMUNICATION

# History of Wireless Communication

## From the Birth of Telecommunications to the Modern Era of Cellular Communications and Wireless Local Area Networks

### The Birth of Telecommunications: The Telegraph

- Pre-1600s — the first telegraph? Perhaps drum communication or signal torches, such as those used for communication in ancient Greece as early as 1100s BC?
- 1664-1685 — Robert Hooke demonstrates acoustic communication using wires stretched over wood frames
- 1747 — William Watson demonstrates transmission of electrical signals over two mile wire
- 1753 — "C.M." proposes extension to Watson's system that uses 26 wires to send messages. Author is elsewhere identified as "Charles Morrison"
- 1774 — George Louis Lesage builds 26-line telegraph based on C.M.'s design
- 1792 — one of the first telecommunications systems of the industrial age was pioneered by Claude Chapped. It was a semaphore system using mechanical arms. This was the first system called "telegraph" meaning "far writer". Other semaphore telegraphs were developed in a similar time frame.
- 1796 — Don Francisco Salvá i Campillo installs 22 wire telegraph system linking Madrid and Aranjuez (50 km distance). Signals are detected by people holding the wires who feel shocks or tingling!
- 1809 — Samuel Thomas von Soemmering develops electro-chemical telegraph based on sending electrical signals over wires through containers of acid.
- 1832 — Baron Pavel L'vovitch Schilling (aka Paul Schilling) demonstrates electromechanical telegraph using binary communication.
- 1833 — Carl Friedrich Gauss and Wilhelm Eduard Weber deploy first regularly used electromechanical telegraph.

**From Telegraph to ``The Birth of Radio'', 1867-1896**

- *1867 — Maxwell predicts existence of electromagnetic (EM) waves
- *1887 — Hertz proves existence of EM waves; first spark transmitter generates a spark in a receiver several meters away
- 1890 — Branly develops *coherer* for detecting radio waves
- 1896 — **Guglielmo Marconi** demonstrates wireless telegraph to English telegraph office

**``The Birth of Radio''**

- *1897 — ``The Birth of Radio" - Marconi awarded patent for wireless telegraph
- 1897 — First ``Marconi station" established on Needles island to communicate with English coast
- 1898 — Marconi awarded English patent no. 7777 for tuned communication
- 1898 — Wireless telegraphic connection between England and France established

**Transoceanic Communication**

- *1901 — Marconi successfully transmits radio signal across Atlantic Ocean from (first wireless communication across the ocean) Cornwall to Newfoundland
- 1902 — First bidirectional communication across Atlantic
- 1909 — Marconi awarded Nobel prize for physics

**Voice over Radio**

- *1914 — First voice over radio transmission
- 1920s — Mobile receivers installed in police cars in Detroit
- 1930s — Mobile transmitters developed; radio equipment occupied most of police car trunk
- *1935 — Frequency modulation (FM) demonstrated by Armstrong
- 1940s — Majority of police systems converted to FM

**Birth of Mobile Telephony**

- 1946 — First interconnection of mobile users to public switched telephone network (PSTN)
- 1949 — FCC recognizes mobile radio as new class of service
- 1940s — Number of mobile users > 50K
- 1950s — Number of mobile users > 500K
- 1960s — Number of mobile users > 1.4M
- 1960s — Improved Mobile Telephone Service (IMTS) introduced; supports full-duplex, auto dial, auto trucking
- 1976 — Bell Mobile Phone has 543 pay customers using 12 channels in the New York City area; waiting list is 3700 people; service is poor due to blocking

**Cellular Mobile Telephony**

- 1979 — NTT/Japan deploys first cellular communication system
- *1983 — Advanced Mobile Phone System (AMPS) deployed in US in 900 MHz band: supports 666 duplex channels
- 1989 — Groupe Spècial Mobile defines European digital cellular standard, GSM
- *1991 — US Digital Cellular phone system introduced
- 1992 — First GSM phones approved for sale.
- 1992 — Text messaging, or short messaging service (SMS), was designed as part of the GSM cellular system.
- *1993 — IS-95 code-division multiple-access (CDMA) spread- spectrum digital cellular system deployed in US
- *1994 — GSM system deployed in US, relabeled ``Global System for Mobile Communications"

**Wireless Local Area Networks**

- 1990 — Formation of IEEE 802.11 Working Group to define standards for Wireless Local Area Networks (WLANs)

- 1997 — Release of IEEE 802.11 WLAN protocol, supporting 1-2 Mbit/s data rates in the 2.4 GHz ISM band
- 1999 — Release of IEEE 802.11b WLAN protocol, supporting 1-11 Mbit/s data rates in the 2.4 GHz ISM band
- 1999 — Release of IEEE 802.11a WLAN protocol, supporting 1-54 Mbit/s data rates in the 5 GHz ISM band
- 2003 — Release of IEEE 802.11g WLAN protocol, supporting 1-54 Mbit/s data rates in the 2.4 GHz ISM band
- 2009 — Release of IEEE 802.11n WLAN protocol, supporting up to 150 Mbit/s data rates in both the 2.4 GHz and 5 GHz ISM bands.

**Wireless Local Area Networks**

- *1995 - FCC auctions off frequencies in Personal Communications System (PCS) band at 1.8 GHz for mobile telephony
- 1997 — Number of cellular telephone users in U.S. > 50M
- 1999 — First of the "third generation" cellular systems are standardized: Universal Mobile Telecommunication System (UMTS) is the follow-on to the GSM system, and cdma2000 is the evolution of the IS-95 CDMA system
- 1999 — Bluetooth specification introduced (See History of Bluetooth. Bluetooth is a wireless personal area network (WPAN) that is often used for cellular headsets and car kits. Later, v. 1.1 was ratified as IEEE Standard 802.15.1-2002. Official Bluetooth web site
- 2008 — FCC no longer requires cellular providers to support analog service. See the 2002 FCC Report and Order

# CHAPTER : 2

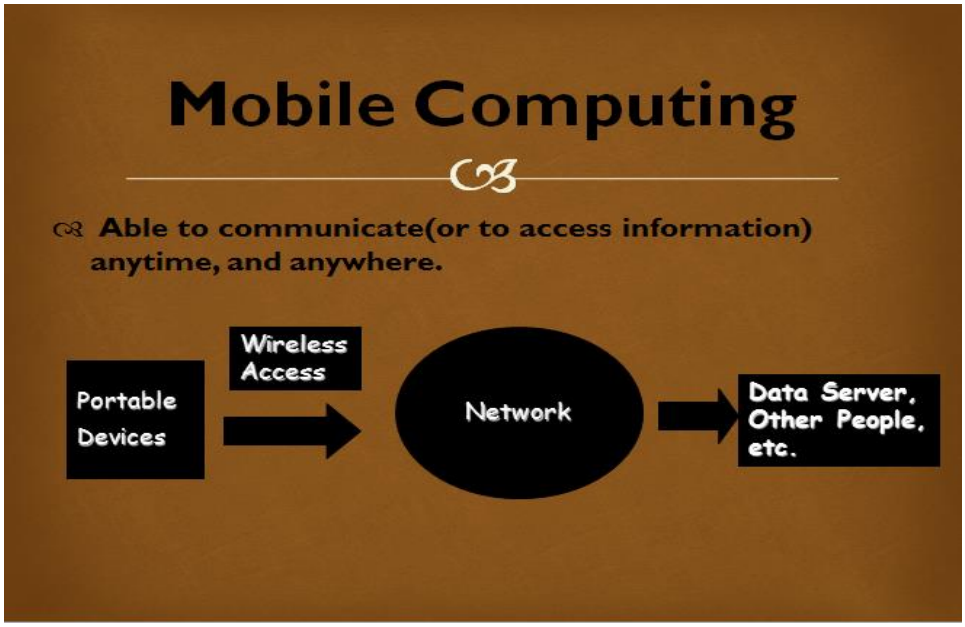
# MOBILE COMPUTING

**MOBILE COMPUTING?**

**According to a dictionary:**

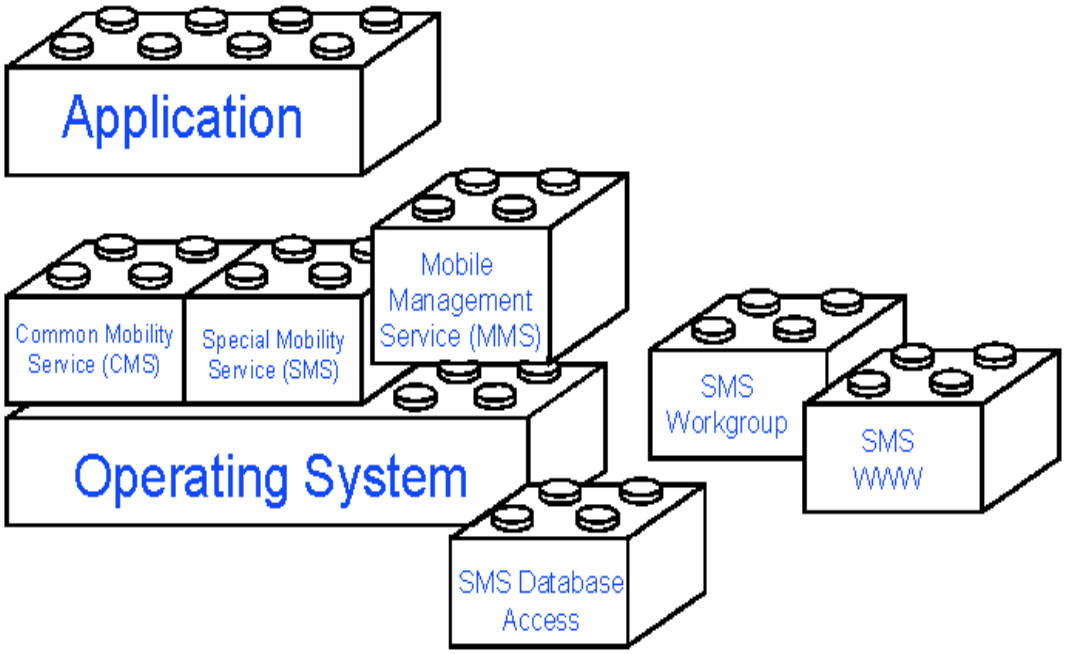
Mobile: Able to move freely.

Computing: The activity of using a computer.




Mobile computing evolved during the last few years as a result of shrinking portables and growing (wireless) networks. It enlarges the usability of computers, but raises demanding challenges. A mobile user has to deal with the problems of slow albeit expensive connection lines, frequent interruption of wireless connections, and limited host performance. "Requirements for mobile services are stability, bandwidth/cost considerations, integration into the familiar environment, application transparency, security and extendibility.

**MOBILE COMPUTING ARCHITECHTURE**




Our Mobile System Architecture supports applications by a middleware stub. Based on these architecture prototypes for Mobile Database Access (MODBC), Mobile Information Access (MWWW) and Mobile File Access (MLDAP) have been built to demonstrate the usability of the proposed approach. The research addresses topics like Application Stability in mobile environments, Multimedia, Quality of Service, Bandwidth and cost awareness, application transparency and Security.

**Evolution of mobile computing**

**MOBILE COMPUTING OPERATING SYSTEM(OS)**

A mobile operating system, also referred to as mobile OS, is the operating system that operates a smartphone, tablet, PDA, or other digital mobile devices. Modern mobile operating systems combine the features of a personal computer operating system with touchscreen, cellular, Bluetooth, Wi-Fi, GPS mobile navigation, camera, video camera, speech recognition, voice recorder, music player, Near field communication, personal digital assistant (PDA), and other features.

**History**

Mobile operating system milestones mirror the development of mobile phones and smartphones:

- 1979–1992 Mobile phones have embedded systems to control operation.
- 1993 The first smartphone, the IBM Simon, had a touchscreen, email, and PDA features.
- 1996 Palm Pilot 1000 personal digital assistant is introduced with the Palm OS mobile operating system.
- 1996 First Windows CE Handheld PC devices are introduced.
- 1999 Nokia S40 OS was officially introduced with the launch of the Nokia 7110
- 2000 Symbian became the first modern mobile OS on a smartphone with the launch of the Ericsson R380.

- 2001 The Kyocera 6035 is the first smartphone with Palm OS.
- 2002 Microsoft's first Windows CE (Pocket PC) smartphones are introduced.
- 2002 BlackBerry releases its first smartphone.
- 2005 Nokia introduced Maemo OS on the first internet tablet N770.
- 2007 Apple iPhone with iOS introduced as an iPhone, "mobile phone" and "internet communicator."
- 2007 Open Handset Alliance (OHA) formed by Google, HTC, Sony, Dell, Intel, Motorola, Samsung, LG, etc.
- 2008 OHA releases Android 1.0 with the HTC Dream (T-Mobile G1) as the first Android phone.
- 2009 Palm introduced webOS with the Palm Pre. By 2012 webOS devices were no longer sold.
- 2009 Samsung announces the Bada OS with the introduction of the Samsung S8500.
- 2010 Windows Phone OS phones are released but are not compatible with the previous Windows Mobile OS.
- 2011 The MeeGo the first mobile Linux, combined Maemo and Moblin, was introduced with Nokia N9 in effect of cooperation of Nokia, Intel and Linux Foundation
- In September 2011 Samsung, Intel and the Linux Foundation announced that their efforts will shift from Bada, MeeGo to Tizen during 2011 and 2012.
- In October 2011 the Mer project was announced, centered around an ultra-portable Linux + HTML5/QML/JS Core for building products with, derived from the MeeGo codebase.
- 2012 The Lenovo K800 will be the first Intel powered smartphone (Android OS).

## Common software platforms

**The most common mobile operating systems are:**

**Android from Google Inc. (free and open source)**

Android was developed by a small startup company that was purchased by Google Inc. in 2005, and Google continues to update the software. Android is a Linux-derived OS backed by Google, along with major hardware and software developers (such as Intel, HTC, ARM, Samsung, Motorola and eBay, to name a few), that form the Open Handset Alliance. Released on November 5th 2007, the OS received praise from a number of developers upon its introduction. Android releases prior to 2.0 (1.0, 1.5, 1.6) were used exclusively on mobile phones. Most Android phones, and some Android tablets, now use a 2.x release. Android 3.0 was a tablet-oriented release and does not officially run on mobile phones. The current Android version is 4.1. Android releases are nicknamed after sweets or dessert items like Cupcake (1.5), Frozen Yogurt (2.2), Honeycomb (3.0), Ice Cream Sandwich (4.0) and Jelly Bean (4.1). Most major mobile service providers carry an Android device. Since the HTC Dream was introduced, there has been an explosion in the number of devices that carry Android OS. From Q2 of 2009 to the second quarter of 2010, Android's worldwide market share rose 850% from 1.8% to 17.2%. On 15 November 2011, Android reached 52.5% of the global smartphone market share.

**Bada from Samsung Electronics (closed source, proprietary)**

This is a mobile operating system being developed by Samsung Electronics. Samsung claims that bada will rapidly replace its proprietary feature phone platform, converting feature phones to smartphones.The name 'bada' is derived from 바다, the Korean word for ocean or sea. The first device to run bada is called 'Wave' and was unveiled to the public at Mobile World Congress 2010. The Wave is a fully touchscreen running the new mobile operating system. With the phone, Samsung also released an app store, called Samsung Apps, to the public. It has close to 3000 mobile applications.

Samsung has said that they don't see Bada as a smartphone operating system, but as an OS with a kernel configurable architecture, which allows the use of either a proprietary real-time operating system, or the Linux kernel. Though Samsung plans to install bada on many phones, the company still has a large lineup of Android phones.

**BlackBerry OS from RIM (closed source, proprietary)**

This OS is focused on easy operation and was originally designed for business. Recently it has seen a surge in third-party applications and has been improved to offer full multimedia support. Currently Blackberry's App World has over 50,000 downloadable applications. RIM's future strategy will focus on the newly acquired QNX, having already launched the BlackBerry Playbook tablet running a version of QNX and expecting the first QNX smartphones in early 2012.

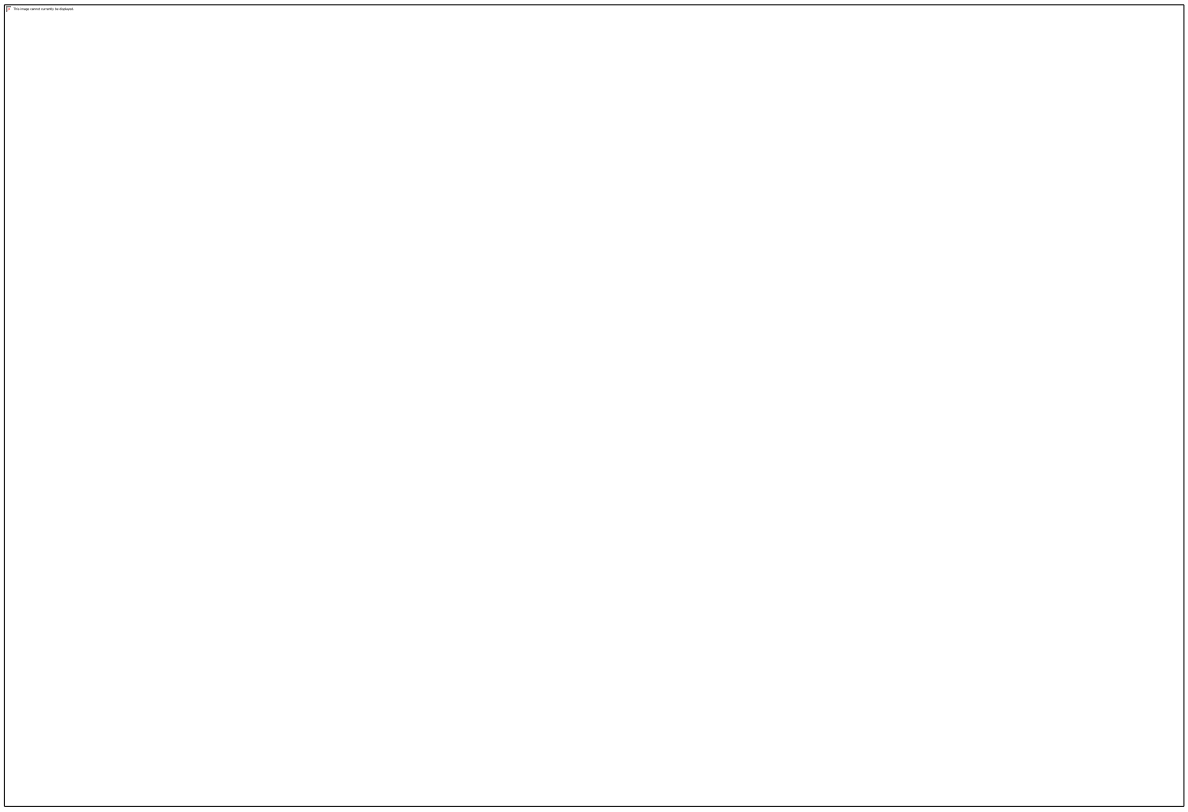

**iOS from Apple Inc. (closed source, proprietary, on top of open source Darwin core OS)**

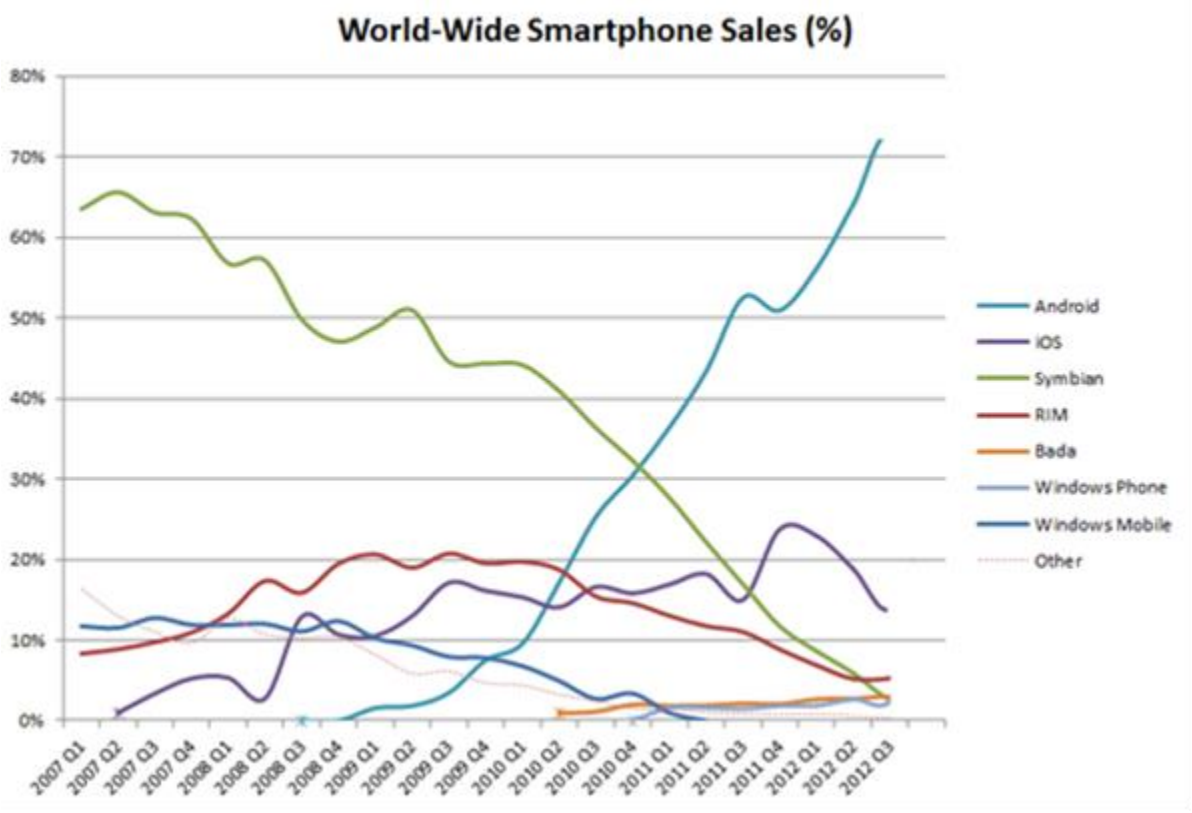
The Apple iPhone, iPod Touch, iPad, and second-generation Apple TV all use an operating system called iOS, which is derived from Mac OS X. Native third party applications were not officially supported until the release of iOS 2.0 on July 11th 2008. Before this, "jailbreaking"

allowed third party applications to be installed, and this method is still available. Currently all iOS devices are developed by Apple and manufactured by Foxconn or another of Apple's partners.

## MARKET SHARE OF DIFFERENT MOBILE OS

**In 2006, Android, iOS, Windows Phone, and Bada did not yet exist and just 64 million smartphones were sold. Today, nearly 10 times as many smartphones are sold and the top mobile operating systems marketed as "smartphones" by market share are Android, Symbian, Apple iOS, RIM BlackBerry, MeeGo, Windows Phone, and Bada. Note that these statistics only include operating systems marketed as "smartphones" (for example, they don't include Nokia's S40 operating system, which according to Nokia's announcement on 25 January 2012, has sold over 1.5 billion S40 devices.).**






## Current market share and outlook

IDC forecasted that Android and iOS would stop gaining market share while Windows Phone will meet iOS market share by 2016. IDC had to dial back their predictions as Android and iOS market shares continue to grow strongly while Windows Phone market share is not able to gain traction. A study by Bernstein Research points out: "The lack of consumer interest for Windows-based phones has been very consistent in marketing surveys we have carried out across the globe over the last several years." and that "The situation of Windows in mobile phones is now very unlikely to revert." Tirias Research principal analyst Jim McGregor said: "The Android system will continue to grow because it's the closest thing we have to an effective open source platform."

# CHAPTER : 3

# ANDROID (OPERATING SYSTEM)

**Android (operating system)**


Android is a Linux-based operating system designed primarily for touchscreen mobile devices such as smartphones and tablet computers. It is currently developed by Google in conjunction with the Open Handset Alliance. Initially developed by Android Inc., whom Google financially backed and later purchased in 2005, Android was unveiled in 2007 along with the founding of the Open Handset Alliance, a consortium of 86 hardware, software, and telecommunication companies devoted to advancing open standards for mobile devices.

Google releases the Android code as open source, under the Apache License. The Android Open Source Project (AOSP), led by Google, is tasked with the maintenance and further development of Android. Additionally, Android has a large community of developers writing applications ("apps") that extend the functionality of devices, written primarily in a customized version of Java. They are available for download through Google Play or third-party sites. In October 2012, there were approximately 700,000 apps available for Android, and the estimated number of applications downloaded from Google Play (and the now-defunct Android Market) was 25 billion.

The first Android-powered phone was sold in October 2008, and by the end of 2010 Android had become the world's leading smartphone platform, overtaking Symbian which held the record previously. It had a worldwide smartphone market share of 75% during the third quarter of 2012, with 500 million devices activated and 1.3 million activations per day. Application of the operating system has also moved beyond mobile phones and tablets; amongst others, televisions, smart books and cameras have been released running Android.

**History**

Android, Inc. was founded in Palo Alto, California in October 2003 by Andy Rubin (co-founder of Danger), Rich Miner (co-founder of Wildfire Communications, Inc.), Nick Sears (once VP at T-Mobile), and Chris White (headed design and interface development at WebTV) to develop, in Rubin's words "...smarter mobile devices that are more aware of its owner's location and preferences." Despite the obvious past accomplishments of the founders and early employees, Android Inc. operated secretly, revealing only that it was working on software for mobile phones. That same year, Rubin ran out of money. Steve Perlman, a close friend of Rubin, brought him $10,000 in cash in an envelope and refused a stake in the company.

Since 2008, Android has seen numerous updates which have incrementally improved the operating system, adding new features and fixing bugs in previous releases. Each major release is named in alphabetical order after a dessert or sugary treat; for example, version 1.5 *Cupcake* was followed by 1.6 *Donut*. The latest release is 4.2 *Jelly Bean*. In 2010, Google launched its Nexus series of devices - a line of smartphones and tablets running the Android operating system, and built by a manufacturer partner. HTC collaborated with Google to release the first Nexus smartphone, the Nexus One. The series has since been updated with newer devices, such as the Galaxy Nexus phone and Nexus 7 tablet, made by Samsung and Asus respectively. Google releases the Nexus phones and tablets to act as their flagship Android devices, demonstrating Android's latest software and hardware features.

**Interface**

Android's user interface is based on direct manipulation, using touch inputs that loosely correspond to real-world actions, like swiping, tapping, pinching and reverse pinching to manipulate on-screen objects. The response to user input is designed to be immediate and provides a fluid touch interface, often using the vibration capabilities of the device to provide haptic feedback to the user. Internal hardware such as accelerometers, gyroscopes and proximity

sensors are used by some applications to respond to additional user actions, for example adjusting the screen from portrait to landscape depending on how the device is oriented, or allowing the user to steer a vehicle in a racing game by rotating the device, simulating control of a steering wheel.

Android devices boot to the home screen, the primary navigation and information point on the device, which is similar to the desktop found on PCs. Android home screens are typically made up of app icons and widgets; app icons launch the associated app, whereas widgets display live, auto-updating content such as the weather forecast, the user's email inbox, or a news ticker directly on the home screen. A homescreen may be made up of several pages that the user can swipe back and forth between, though Android's homescreen interface is heavily customizable, allowing the user to adjust the look and feel of the device to their tastes. Third party apps available on Google Play and other app stores can extensively re-theme the homescreen, and even mimic the look of other operating systems, such as Windows Phone. Most manufacturers, and some wireless carriers, customize the look and feel of their Android devices to differentiate themselves from the competition.

Present along the top of the screen is a status bar, showing information about the device and its connectivity. This status bar can be "pulled" down to reveal a notification screen where apps display important information or updates, such as a newly received email or SMS text, in a way that doesn't immediately interrupt or inconvenience the user. In early versions of Android these notifications could be tapped to open the relevant app, but recent updates have provided enhanced functionality, such as the ability to call a number back directly from the missed call notification without having to open the dialer app first. Notifications are persistent until read or dismissed by the user.

**Applications**


Play Store on the Galaxy Nexus.

Applications are developed in the Java language using the Android software development kit (SDK). The SDK includes a comprehensive set of development tools, including a debugger, software libraries, a handset emulator based on QEMU, documentation, sample code, and tutorials. The officially supported integrated development environment (IDE) is Eclipse using the Android Development Tools (ADT) plugin. Other development tools are available, including a Native Development Kit for applications or extensions in C or C++, Google App Inventor, a visual environment for novice programmers, and various cross platform mobile web applications frameworks.

In order to work around limitations on reaching Google services due to Internet censorship in the People's Republic of China, Android devices sold in the PRC are generally customized to use state approved services instead.

**Memory management**

Since Android devices are usually battery-powered, Android is designed to manage memory (RAM) to keep power consumption at a minimum, in contrast to desktop operating systems which generally assume they are connected to unlimited mains electricity. When an Android app is no longer in use, the system will automatically suspend it in memory - while the app is still

technically "open," suspended apps consume no resources (e.g. battery power or processing power) and sit idly in the background until needed again. This has the dual benefit of increasing the general responsiveness of Android devices, since apps don't need to be closed and reopened from scratch each time, but also ensuring background apps don't waste power needlessly.

Android manages the apps stored in memory automatically: when memory is low, the system will begin killing apps and processes that have been inactive for a while, in reverse order since they were last used (i.e. oldest first). This process is designed to be invisible to the user, such that users do not need to manage memory or the killing of apps themselves. However, confusion over Android memory management has resulted in third-party task killers becoming popular on the Google Play store; these third-party task killers are generally regarded as doing more harm than good.

**Update schedule**

Google provides major updates, incremental in nature, to Android every six to nine months, which most devices are capable of receiving over the air. The latest major update is Android 4.2 *Jelly Bean*.

Compared to rival mobile operating systems, namely iOS, Android updates are typically very slow in reaching devices, often taking several months from the official Google release date to actually being distributed to devices. This is caused partly due to the extensive variation in hardware of Android devices, to which each update must be specifically tailored, as the official Google source code only runs on their flagship Nexus phone. Porting Android to specific hardware is a time- and resource-consuming process for device manufacturers, who prioritize their newest devices and often leave older ones behind. Hence, older smartphones are frequently not updated if the manufacturer decides it is not worth their time, regardless of whether the phone is capable of running the update. This problem is compounded when manufacturers customize Android with their own interface and apps, which must be reapplied to each new release. Additional delays can be introduced by wireless carriers who, after receiving updates from manufacturers, further customize and brand Android to their needs and conduct extensive testing on their networks before sending the update out to users.

The lack of after-sale support from manufacturers and carriers has been widely criticized by consumer groups and the technology media. Some commentators have noted that the industry has a financial incentive *not* to update their devices, as the lack of updates for existing devices fuels the purchase of newer ones, an attitude described as "insulting". The Guardian has complained that the complicated method of distribution for updates is only complicated because manufacturers and carriers have designed it that way. In 2011, Google partnered with a number of industry players to announce an "Android Update Alliance", pledging to deliver timely updates for every device for 18 months after its release. As of 2012, this alliance has never been mentioned since.

**Open source community**

Android has an active community of developers and enthusiasts who use the Android source code to develop and distribute their own modified versions of the operating system. These community-developed releases often bring new features and updates to devices faster than through the official manufacturer/carrier channels, albeit without as extensive testing or quality assurance; provide continued support for older devices that no longer receive official updates; or bring Android to devices that were officially released running other operating systems, such as the HP Touchpad. Community releases often come pre-rooted and contain modifications unsuitable for non-technical users, such as the ability to overclock or over/undervolt the device's processor. CyanogenMod is the most widely used community firmware, and acts as a foundation for numerous others.

Historically, device manufacturers and mobile carriers have typically been unsupportive of third-party firmware development. Manufacturers express concern about improper functioning of devices running unofficial software and the support costs resulting from this. Moreover, modified firmwares such as CyanogenMod sometimes offer features, such as tethering, for which carriers would otherwise charge a premium. As a result, technical obstacles including locked bootloaders and restricted access to root permissions are common in many devices. However, as community-developed software has grown more popular, and following a statement by the Librarian of Congress in the United States that permits the "jailbreaking" of mobile devices, manufacturers and carriers have softened their position regarding third party development, with

some, including HTC, Motorola, Samsung and Sony Ericsson, providing support and encouraging development. As a result of this, over time the need to circumvent hardware restrictions to install unofficial firmware has lessened as an increasing number of devices are shipped with unlocked or unlock*able* bootloaders, similar to the Nexus series of phones, although usually requiring that users waive their devices' warranties to do so. However, despite manufacturer acceptance, some carriers in the US still require that phones are locked down.

The unlocking and "hackability" of smartphones and tablets remains a source of tension between the community and industry, with the community arguing that unofficial development is increasingly important given the failure of industry to provide timely updates and/or continued support to their devices.

**Security and privacy**

Android applications run in a sandbox, an isolated area of the system that does not have access to the rest of the system's resources, unless access permissions are explicitly granted by the user when the application is installed. Before installing an application, the Play Store displays all required permissions: a game may need to enable vibration or save data to an SD card, for example, but should not need to read SMS messages or access the phonebook. After reviewing these permissions, the user can choose to accept or refuse them, installing the application only if they accept.

The sandboxing and permissions system lessens the impact of vulnerabilities and bugs in applications, but developer confusion and limited documentation has resulted in applications routinely requesting unnecessary permissions, reducing its effectiveness. Several security firms, such as Lookout Mobile Security, AVG Technologies, and McAfee, have released antivirus software for Android devices. This software is ineffective as sandboxing also applies to such applications, limiting their ability to scan the deeper system for threats.

Research from security company Trend Micro lists premium service abuse as the most common type of Android malware, where text messages are sent from infected phones to premium-rate telephone numbers without the consent or even knowledge of the user. Other malware displays

unwanted and intrusive adverts on the device, or sends personal information to unauthorized third parties. Security threats on Android are reportedly growing exponentially; however, Google engineers have argued that the malware and virus threat on Android is being exaggerated by security companies for commercial reasons, and have accused the security industry of playing on fears to sell virus protection software to users. Google maintains that dangerous malware is actually extremely rare.

Google currently uses their Google Bouncer malware scanner to watch over and scan the Google Play store apps. It is intended to flag up suspicious apps and warn users of any potential issues with an application before they download it. Android version 4.2 *Jelly Bean* was released in 2012 with enhanced security features, including a malware scanner built into the system, which works in combination with Google Play but can scan apps installed from third party sources as well; and an alert system which notifies the user when an app tries to send a premium-rate text message, blocking the message unless the user explicitly authorises it.

Android smartphones have the ability to report the location of Wi-Fi access points, encountered as phone users move around, to build databases containing the physical locations of hundreds of millions of such access points. These databases form electronic maps to locate smartphones, allowing them to run apps like Foursquare, Google Latitude, Facebook Places, and to deliver location-based ads.[97] Third party monitoring software such as TaintDroid, an academic research-funded project, can, in some cases, detect when personal information is being sent from applications to remote servers.

**Licensing**

The source code for Android is available under free and open source software licenses. Google publishes most of the code (including network and telephony stacks) under the Apache License version 2.0, and the rest, Linux kernel changes, under the GNU General Public License version 2. The Open Handset Alliance develops the changes to the Linux kernel, in public, with source code publicly available at all times. The rest of Android is developed in private by Google, with source code released publicly when a new version is released. Typically Google collaborates with a hardware manufacturer to produce a 'flagship' device (part of the Google Nexus series)

featuring the new version of Android, then makes the source code available after that device has been released.

In early 2011, Google chose to temporarily withhold the Android source code to the tablet-only 3.0 *Honeycomb* release. The reason, according to Andy Rubin in an official Android blog post, was because *Honeycomb* was rushed for production of the Motorola Xoom, and they did not want third parties creating a "really bad user experience" by attempting to put onto smartphones a version of Android intended for tablets. The source code was once again made available in November 2011 with the release of Android 4.0.

Even though the software is open-source, device manufacturers cannot use Google's Android trademark unless Google certifies that the device complies with their Compatibility Definition Document (CDD). Devices must also meet this definition to be eligible to license Google's closed-source applications, including Google Play. As Android is not completely released under a GPL compatible license, e.g. Google's code is under the Apache license, and also because Google Play allows proprietary software, Richard Stallman and the Free Software Foundation have been critical of Android and have recommended the usage of alternatives such as Replicant. thin a few years.

**Market share and rate of adoption**

Research company Canalys estimated in the second quarter of 2009 that Android had a 2.8% share of worldwide smartphone shipments. By the fourth quarter of 2010 this had grown to 33% of the market, becoming the top-selling smartphone platform. By the third quarter of 2011 Gartner estimated that more than half (52.5%) of the smartphone market belongs to Android. By the third quarter of 2012 Android had a 75% share of the global smartphone market according to the research firm IDC.

In July 2011, Google said that 550,000 new Android devices were being activated every day, up from 400,000 per day in May, and more than 100 million devices had been activated with 4.4% growth per week. In September 2012, 500 million devices had been activated with 1.3 million activations per day.

Android market share varies by location. In July 2012, Android's market share in the United States was 52%, but this rises to 90% in China.

**Usage share of Android versions**

Usage share of the different versions as of November 1, 2012. Most Android devices to date still run the older OS version 2.3 *Gingerbread* that was released on December 6, 2010, due to most lower-end devices still being released with it.

# CHAPTER : 4

# iOS (Operating System ) APPLE.

# iOS OPERATING SYSTEM


Apple Mobile Phone Main Screen

## Apple's mobile operating system

iOS (previously iPhone OS) is a mobile operating system developed and distributed by Apple Inc. Originally released in 2007 for the iPhone and iPod Touch, it has been extended to support other Apple devices such as the iPad and Apple TV. Unlike Microsoft's Windows Phone (Windows CE) and Google's Android, Apple does not license iOS for installation on non-Apple hardware. As of September 12, 2012, Apple's App Store contained more than 700,000 iOS applications, which have collectively been downloaded more than 30 billion times. It had a 14.9% share of the smartphone mobile operating system units shipped in the third quarter of 2012, behind only Google's Android. In June 2012, it accounted for 65% of mobile web data consumption (including use on both the iPod Touch and the iPad). At the half of 2012, there were 410 million devices activated. According to the special media event held by Apple on September 12, 2012, 400 million devices have been sold through June 2012.

The user interface of iOS is based on the concept of direct manipulation, using multi-touch gestures. Interface control elements consist of sliders, switches, and buttons. Interaction with the OS includes gestures such as swipe, tap, pinch, and reverse pinch, all of which have specific definitions within the context of the iOS operating system and its multi-touch interface. Internal accelerometers are used by some applications to respond to shaking the device (one common result is the undo command) or rotating it in three dimensions (one common result is switching from portrait to landscape mode).

In iOS, there are four abstraction layers: the Core OS layer, the Core Services layer, the Media layer, and the Cocoa Touch layer. The current version of the operating system (iOS 6.0) dedicates 1-1.5 GB of the device's flash memory for the system partition, using roughly 800 MB of that partition (varying by model) for iOS itself.

## History

The operating system was unveiled with the iPhone at the Macworld Conference & Expo, January 9, 2007, and released in June of that year. At first, Apple marketing literature did not specify a separate name for the operating system, stating simply that the "iPhone runs OS X". Initially, third-party applications were not supported. Steve Jobs' reasoning was that developers could build web applications that "would behave like native apps on the iPhone". On October 17, 2007, Apple announced that a native Software Development Kit (SDK) was under development and that they planned to put it "in developers' hands in February". On March 6, 2008, Apple released the first beta, along with a new name for the operating system: "iPhone OS".

Apple had released the iPod touch, which had most of the non-phone capabilities of the iPhone. Apple also sold more than one million iPhones during the 2007 holiday season. On January 27, 2010, Apple announced the iPad, featuring a larger screen than the iPhone and iPod touch, and designed for web browsing, media consumption, and reading iBooks.

In June 2010, Apple rebranded iPhone OS as "iOS". The trademark "IOS" had been used by Cisco for over a decade for its operating system, IOS, used on its routers. To avoid any potential lawsuit, Apple licensed the "IOS" trademark from Cisco.

By late 2011, iOS accounted for 60 percent of the market share for smartphones and tablet computers, however by mid-2012 iOS had slipped to just 16.9% and Android had taken over with 68.1% global share.

## Notification Center

In the iOS 5 update, the notifications feature was completely redesigned. Notifications collate in a window which can be dragged down from the top of the screen. If a user touches a received notification, the application that sent the notification will be opened.

### Included applications

PHONE,MESSAGE,MAIL,SAFARI,MUSIC,STOCKS,CONTACTS,CALCULATO,,VOICEMEMO,FACETIME,CALENDAR,PHOTOS,CAMERA,VIDEO,CLOCK,MAPS,WEATHER,NOTES,REMINDERS,GAMECENTER,NEWSSTAND,ITUNE, APP STORE,PASSBOOK,

### Multitasking

Before iOS 4, multitasking was limited to a selection of the applications Apple included on the device. Users could, however "jailbreak" their device in order to unofficially multitask.Starting with iOS 4, on 3rd-generation and newer iOS devices, multitasking is supported through seven background APIs:

1. Background audio – application continues to run in the background as long as it is playing audio or video content
2. Voice over IP – application is suspended when a phone call is not in progress
3. Background location – application is notified of location changes
4. Push notifications

5. Local notifications – application schedules local notifications to be delivered at a predetermined time
6. Task completion – application asks the system for extra time to complete a given task
7. Fast app switching – application does not execute any code and may be removed from memory at any time

In iOS 5, three new background APIs were introduced:

1. Newsstand – application can download content in the background to be ready for the user
2. External Accessory – application communicates with an external accessory and shares data at regular intervals
3. Bluetooth Accessory – application communicates with a bluetooth accessory and shares data at regular intervals

# CHAPTER : 5

# BlueTooth

# Bluetooth


**Bluetooth** is a wireless technology standard for exchanging data over short distances (using short-wavelength radio transmissions in the ISM band from 2400–2480 MHz) from fixed and mobile devices, creating personal area networks (PANs) with high levels of security. Created by telecoms vendor Ericsson in 1994,[1] it was originally conceived as a wireless alternative to RS-232 data cables. It can connect several devices, overcoming problems of synchronization.

Bluetooth is managed by the Bluetooth Special Interest Group, which has more than 17,000 member companies in the areas of telecommunication, computing, networking, and consumer electronics. The SIG oversees the development of the specification, manages the qualification program, and protects the trademarks. To be marketed as a Bluetooth device, it must be qualified to standards defined by the SIG. A network of patents is required to implement the technology and are licensed only for those qualifying devices.

The word "Bluetooth" is an anglicised version of the Scandinavian *Blåtand*/*Blåtann*, the epithet of the tenth-century king Harald I of Denmark and parts of Norway who united dissonant Danish tribes into a single kingdom. The idea of this name was proposed by Jim Kardach who developed a system that would allow mobile phones to communicate with computers (at the time he was reading Frans Gunnar Bengtsson's historical novel *The Long Ships* about Vikings and king Harald Bluetooth).[4] The implication is that Bluetooth does the same with communications protocols, uniting them into one universal standard.[5][6][7]

The Bluetooth logo is a bind rune merging the Younger Futhark runes ᚼ (Hagall) (ᚼ) and ᛒ (Bjarkan) (ᛒ), Harald's initials.

## Implementation

Bluetooth uses a radio technology called frequency-hopping spread spectrum, which chops up the data being sent and transmits chunks of it on up to 79 bands (1 MHz each; centered from

2402 to 2480 MHz) in the range 2,400–2,483.5 MHz (allowing for guard bands). This range is in the globally unlicensed Industrial, Scientific and Medical (ISM) 2.4 GHz short-range radio frequency band. It usually performs 800 hops per second, with Adaptive Frequency-Hopping (AFH) enabled.

Originally Gaussian frequency-shift keying (GFSK) modulation was the only modulation scheme available; subsequently, since the introduction of Bluetooth 2.0+EDR, π/4-DQPSK and 8DPSK modulation may also be used between compatible devices. Devices functioning with GFSK are said to be operating in basic rate (BR) mode where an instantaneous data rate of 1 Mbit/s is possible. The term Enhanced Data Rate (EDR) is used to describe π/4-DPSK and 8DPSK schemes, each giving 2 and 3 Mbit/s respectively. The combination of these (BR and EDR) modes in Bluetooth radio technology is classified as a "BR/EDR radio".

## Uses

Bluetooth is a standard wire-replacement communications protocol primarily designed for low power consumption, with a short range (power-class-dependent, but effective ranges vary in practice; see table below) based on low-cost transceiver microchips in each device. Because the devices use a radio (broadcast) communications system, they do not have to be in visual line of sight of each other, however a *quasi optical* wireless path must be viable.

| Class | Maximum permitted power (mW) | (dBm) | Range (m) |
|---|---|---|---|
| **Class 1** | 100 | 20 | ~100[10] |
| **Class 2** | 2.5 | 4 | ~10[10] |
| **Class 3** | 1 | 0 | ~1[10] |

The effective range varies due to propagation conditions, material coverage, production sample variations, antenna configurations and battery conditions. In most cases the effective range of Class 2 devices is extended if they connect to a Class 1 transceiver, compared to a pure Class 2

network. This is accomplished by the higher sensitivity and transmission power of Class 1 devices.

| Version | Data rate | Maximum application throughput |
|---|---|---|
| **Version 1.2** | 1 Mbit/s | 0.7 Mbit/s |
| **Version 2.0 + EDR** | 3 Mbit/s | 2.1 Mbit/s |
| **Version 3.0 + HS** | See Version 3.0+HS. | |
| **Version 4.0** | See Version 4.0LE. | |

While the Bluetooth Core Specification does mandate minima for range, the range of the technology is application specific and is not limited. Manufacturers may tune their implementations to the range needed for individual use cases.

### List of applications

- Wireless control of and communication between a mobile phone and a handsfree headset. This was one of the earliest applications to become popular.
- Wireless control of and communication between a mobile phone and a Bluetooth compatible car stereo system
- Wireless Bluetooth headset and Intercom.
- Wireless networking between PCs in a confined space and where little bandwidth is required.
- Wireless communication with PC input and output devices, the most common being the mouse, keyboard and printer.
- Transfer of files, contact details, calendar appointments, and reminders between devices with OBEX.
- Replacement of previous wired RS-232 serial communications in test equipment, GPS receivers, medical equipment, bar code scanners, and traffic control devices.
- For controls where infrared was often used.
- For low bandwidth applications where higher USB bandwidth is not required and cable-free connection desired.

# CHAPTER : 6

# GPRS (General Packet Radio Service)

# General Packet Radio Service

**General packet radio service (GPRS)** is a packet oriented mobile data service on the 2G and 3G cellular communication system's global system for mobile communications (GSM). GPRS was originally standardized by European Telecommunications Standards Institute (ETSI) in response to the earlier CDPD and i-mode packet-switched cellular technologies. It is now maintained by the 3rd Generation Partnership Project (3GPP).[1][2]

GPRS usage is typically charged based on volume of data transferred, contrasting with circuit switched data, which is usually billed per minute of connection time. GPRS data may be sold either as part of a bundle (e.g., up to 5 GB per month for a fixed fee) or on a pay-as-you-use basis. Usage above the bundle cap is either charged per megabyte or disallowed.

GPRS is a best-effort service, implying variable throughput and latency that depend on the number of other users sharing the service concurrently, as opposed to circuit switching, where a certain quality of service (QoS) is guaranteed during the connection. In 2G systems, GPRS provides data rates of 56–114 kbit/second.[3] 2G cellular technology combined with GPRS is sometimes described as 2.5G, that is, a technology between the second (2G) and third (3G) generations of mobile telephony.It provides moderate-speed data transfer, by using unused time division multiple access (TDMA) channels in, for example, the GSM system. GPRS is integrated into GSM Release 97 and newer releases.

## Technical overview

The GPRS core network allows 2G, 3G and WCDMA mobile networks to transmit IP packets to external networks such as the Internet. The GPRS system is an integrated part of the GSM network switching subsystem.

### Services offered

GPRS extends the GSM Packet circuit switched data capabilities and makes the following services possible:

- SMS messaging and broadcasting
- "Always on" internet access
- Multimedia messaging service (MMS)
- Push to talk over cellular (PoC)
- Instant messaging and presence—wireless village
- Internet applications for smart devices through wireless application protocol (WAP)
- Point-to-point (P2P) service: inter-networking with the Internet (IP)
- Point-to-Multipoint (P2M) service: point-to-multipoint multicast and point-to-multipoint group calls

If SMS over GPRS is used, an SMS transmission speed of about 30 SMS messages per minute may be achieved. This is much faster than using the ordinary SMS over GSM, whose SMS transmission speed is about 6 to 10 SMS messages per minute.

### Protocols supported

GPRS supports the following protocols:

- Internet protocol IP. In practice, built-in mobile browsers use IPv4 since IPv6 was not yet popular.
- Point-to-point protocol (PPP). In this mode PPP is often not supported by the mobile phone operator but if the mobile is used as a modem to the connected computer, PPP is used to tunnel IP to the phone. This allows an IP address to be assigned dynamically (IPCP not DHCP) to the mobile equipment.
- X.25 connections. This is typically used for applications like wireless payment terminals, although it has been removed from the standard. X.25 can still be supported over PPP, or even over IP, but doing this requires either a network based router to

performencapsulation or intelligence built in to the end-device/terminal; e.g., user equipment (UE).

## CONCULSION

Our lives have already been positively influenced by using wireless technologies. They make us more efficient in communicating and collaborating. Diseases and the health of the human body can be more efficiently monitored with smartphones and in-body and in-home sensor networks. Hearing problems can be solved and prevented by using wireless hearing aids. Wireless power transport is also a very promising domain, with technologies for charging and or real time powering sensors and other devices. Thus it can be concluded that wireless technologies will indeed improve our life quality.

There are however a few points to consider when using wireless technologies. First, the wireless transmission of both power and data will never be as efficient as their wired counterparts. Also privacy and security are better when using wired networks.

Second, the possibility exists that signals radiated by wireless transmission devices are not that healthy and third, life can be more stressful if the mobile office is taken home.

So wireless technologies will indeed improve our life quality, but they should be used with care.