

Unit 2: Function of Mobile Operating System

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2.1 LEARNING OBJECTIVE

To understand the functions of mobile operating system such as call management, notification management, resource management etc.

2.2 INTRODUCTION

Mobile operating system is used to run the smartphones, tablets and handheld devices. Mobile operating system combines the features of the computer operating system with other features which are useful to mobile devices as well as the hand held devices. Modern mobile operating system includes the Bluetooth, WI-FI, cellular, touchscreen, protected access, GPS (Global Positioning System) for mobile navigation, camera to capture the high quality video and images, speech recognition, voice recorder, music player and infrared blaster.

Mobile devices which having the ability to communication which are contain operating system such as the real time operating system support to the serving the real time applications that are process the data in real time mode. Real time operating system working on the basis of the time bound which has the well-defined fixed time constraints.

2.3 NEED OF MOBILE OPERATING SYSTEM

Mobile operating system is the system software which are control the mobile devices as well as it provides the interaction between the user and the hardware of the mobile. A good smartphones OS is boot quickly and provides the beautiful UI to the user for controlling the smartphone. Nowadays peoples are become very busy because of fast life they want to manage the personal information such as notes, calendar, to-do lists, alarms and reminders, this task are not possible without the mobile operating system. Every user wants to surfing the internet on to the smartphone which is not possible by the good mobile operating system.

2.4 HISTORY OF MOBILE OPERATING SYSTEM

- **1993**

Mobile phone used embedded system to control the operations.

- **1993-1999**

1993- Apple launched the Newton operating system for its portable computers.

1998- Symbian OS is developed by the Symbian Ltd. This OS is used by different mobile phones.

1999- Nokia S40 platform is introduced officially.

- **2000s**

2000- Symbian becomes a first OS which are running on to the smartphones.

2002- Blackberry launched its first smartphone.

2005- Nokia developed Maemo OS running on the first internet tablet.

2007- Apple launched iOS operating system for its iPod, mobile phone and internet communicator.

2008- OHA released the Android 1.0 which is running on to the HTC dream as the first android smartphone.

2009- Samsung developed the Bada OS.

- **2010s**

2010- Windows Phone OS was released.

2011- MeeGo mobile operating system is introduced by the Nokia, Intel and Linux foundation.

2012- Apple launched iOS 6.

2013- BlackBerry launched BlackBerry 10 mobile operating system.

2014- Microsoft released windows phone 8.1.

2015- Google released Android 5.1 "Lollipop"

2016- Microsoft released windows phone 10 OS anniversary updates.

2017- Google released Android 8.0 "Oreo".

2018- Apple announced iOS 12.

2.5 FUNCTIONALITIES OF MOBILE OPERATING SYSTEM

➤ **Computing on Mobility**

Mobile Computing is a technology in which transmission of data, voice and video by using a computer and other device without having to be connected to a fixed physical link. Mainly computing on mobility includes the mobile

communication. Mobile communication includes protocols, services, bandwidth and portals to support the stated services. Also data format is defined in that stage to ensure that there is no collision with other existing system.

➤ **Location Identification**

Location identification is the important task track the location of the mobile phone, whether moving or stationary. Location identification is done by using different mechanism such as location identification based on, radio frequency of cell towers of the network or simply by the GPS (Global Positioning System). To track the location of mobile based on to the multilateration of radio signals, it must emit at least the roaming signal to contact the next nearby antenna tower.

Location identification of mobile phones is done by different ways which are listed below.

- SIM-based

Location identification is also done by using the SIM (subscriber identity module) in GSM and UMTS (Universal Mobile Telecommunications System), possible to obtain the raw radio measurements from the handset. Information is obtained from the SIM may be differed from that information which is obtained by the handset.

- Handset-based

The location identification is done by using the handset with the help of client software installed on to the handset. If the handset is equipped with the GPS then it gives more accurate location.

- Wi-Fi-based

Latest smartphone provides the facility to track the mobile phones by using the Wi-Fi. Many smartphones are combined with GPS and Wi-Fi positioning.

- Hybrid

Hybrid technique is the combination of network based and the handset based technique for location identification.

➤ **Call Management**

Call management is the process and design of implementation of inbound call parameters which routing through the network. This process is used by the call centers and the corporations. Call management working according to the calling

features such as the IVR menus, Call queues, Recorded announcements and the hunt groups.

- **Calling features**

Call management features are varying from system to system. Different call recording software's are used to record the incoming and outgoing calls with the time, date and duration. A Hub group is the directory which includes the one or many destination numbers. Call queue is used to keep the call on to the hold until the one destination number is available on to the calling.

- **Routing**

Call routing is the internal mechanism which is included the path selection for the inbound telephones calls. Individual agents used the computer telephonic integration system to function within the network. Automated process includes the translation which is automatic routing of the inbound calls from on mobile number to other mobile number.

➤ **Notification Management**

Notification management includes incoming messages, calendar events and new incoming Gmail etc. notification working on the differently for different applications but they are easy to manage. Also notification management varies on different versions of the mobile operating systems.

- **Status bar and notification drawer**

When notification comes on to the smartphone it appears on to the status bar of the smartphone.

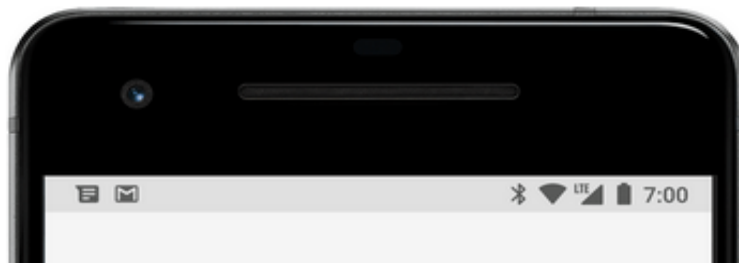


Figure-34 Notification icon

User can swipe down the status bar to open the new notifications and user is capable to take the action as per the requirements.

- Heads-up notification

In Android 5.0 the notification can appear on to the floating window called a heads-up notification. It appeared only if the smartphone is unlocked.

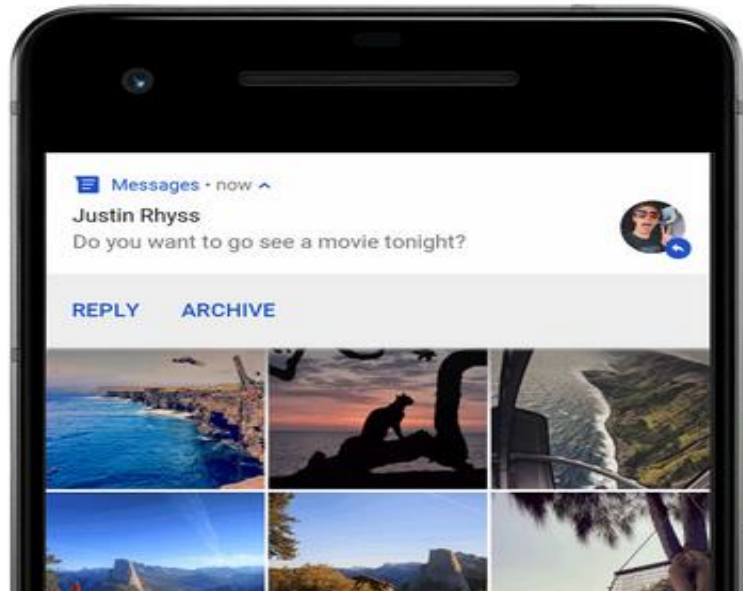


Figure-35 Heads-up notification [1]

- Lock screen

Notifications can appear on to the lock screen in Android 5.0. User can set the notification privacy from the setting such as hiding the sensitive data etc. User can use the system setting to choose the level of detail visible in lock screen notification.

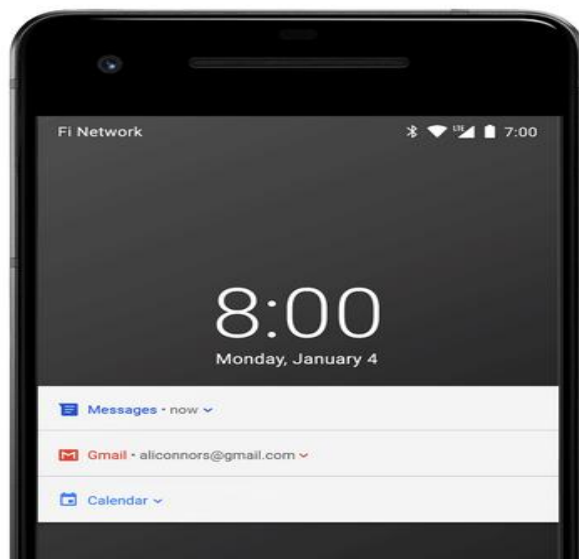


Figure-36 Notifications on lock screen [1]

➤ **Mobile Hardware Management**

ARM processor used in the smartphone for efficient performance. It gives great performance with the low cost power. Processors which are used in mobile are quite different from those processors which are used in the laptop or in the computers. ARM processor becomes the popular processor because of its capabilities like, optimization of battery life with good performance. Modem processor is separated by the ARM processor.

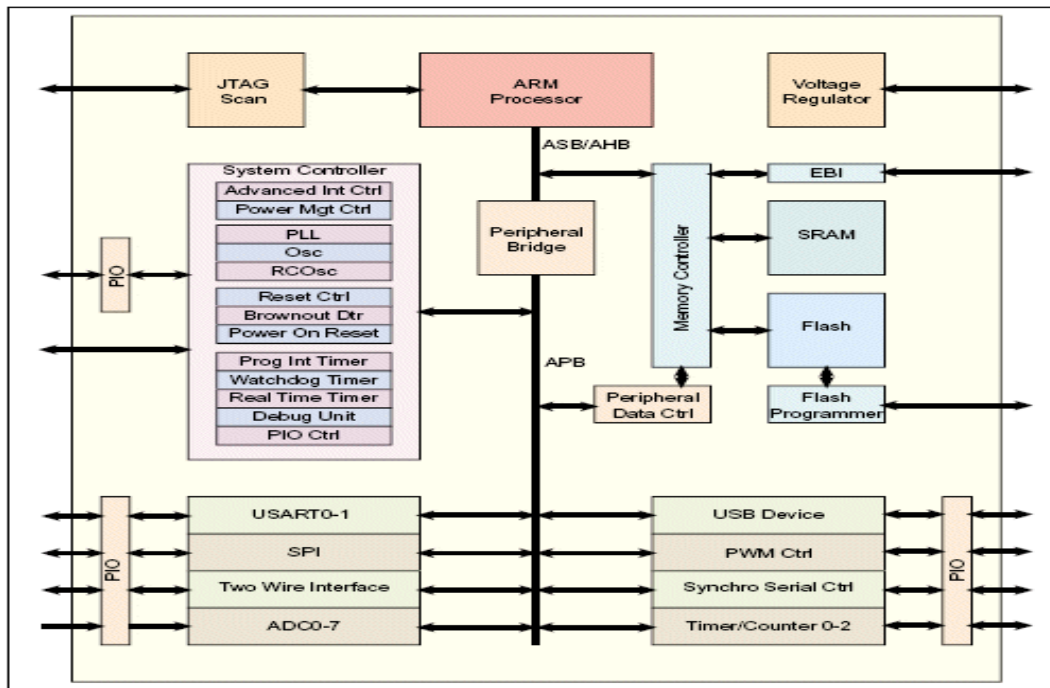


Figure-37 ARM architecture [2]

Mobile hardware management is the critical task. Challenges of the mobile hardware like consumer demands shifting away from the hardware performance. Raw performance may be losing the priority for new development of the smartphones.

➤ **Mobile application management and synchronization management**

Mobile application management gives the information about the software and service responsible for controlling access to internally develop and also commercial apps provided by the third party. The mobile application management provides the granular controls at the application level to protect the app data. Also some enterprise mobility management software's including the mobile application management functionality.

Synchronization management is the technique in which data of smartphone is synchronized with the applications of the computer. Mobile devices must have some way of loading applications, updates, and changes to their operating systems or settings. Even devices capable of wireless networking must have some way of loading software, if only to load what is needed to create the wireless connection in the first place. You can do this by synchronizing the device's operating system and applications with either a desktop management program or individual applications on a personal computer.

➤ **Battery power management**

Battery life of smartphone is the main area of its performance because without battery, smartphone is useless. Batteries in leading Android phone are bigger in every time but it's not possible to save the battery life with the applications support. Android operating system tries to develop the application which is supports to save the battery life for long lasting performance by the smartphones.

Also every smartphone provide the facility of battery saver mode to the user which is helpful to save the battery of smartphone in the emergency mode.

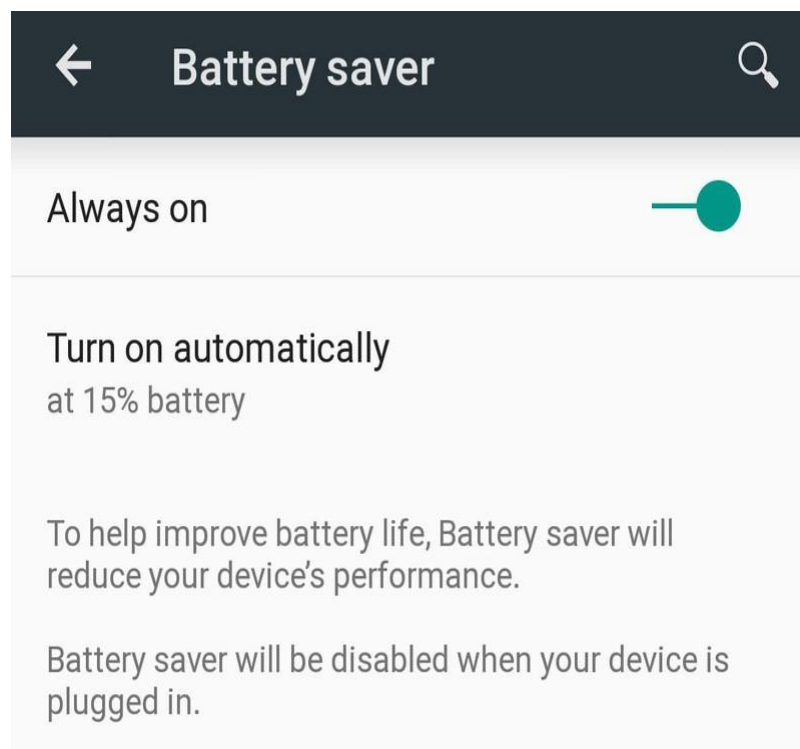


Figure-38 Battery saver [3]

2.6 CONSTRAINED OF MOBILE OPERATING SYSTEM

Design of the mobile operating system is differ from the design of the OS which are running on to the computers. Mobile operating system have some constrained which are listed below.

- Physical Constrained
 - Battery- powered device- Power management of smartphone
 - Display- Small screen varying resolution, shape and size.
 - Memory – Memory Management is challenging in different handsets.
- Uncertainty Constrained
 - Networks come and go- Discontinued internet connectivity.
 - OS need to provide robust methods for handling connections and coping with service interruptions and ad hoc attempts to communicate.

2.7 LET US SUM UP

Mobile operating system plays important role to manage all hardware components of the mobile devices. Also mobile operating system manages the phone calls, text SMS etc.

2.8 CHECK YOUR PROGRESS

1. Explain history of mobile operating system?
2. Why mobile operating system is needed?
3. What is location identification?
4. Explain the call management in mobile operating system?
5. What is ARM processor?

2.9 CHECK YOUR PROGRESS: POSSIBLE ANSWERS

1. Refer 2.4
2. Refer 2.3
3. Refer 2.5
4. Refer 2.5

5. ARM processor used in the smartphone for efficient performance with low cost power.

2.10 ASSIGNMENTS

1. What is the operating system?
2. Explain notification management?
3. Which are constrained of mobile operating system?
4. Explain role of battery saver?
5. Explain Synchronization management technique?

2.11 ACTIVITIES

1. Make a case study on processor of smartphones.

2.12 FURTHER READING AND REFERENCES

1. <https://edu.gcfglobal.org/en/androidbasics/managing-notifications-on-android/1/>
2. <https://www.networxsecurity.org/members-area/glossary/a/arm-architecture.html>
3. <https://www.androidcentral.com/android-l-preview-battery-and-power-management>