Dual-boot Operating Systems in Smartphone

Ms. Sopna Edwin (1)
Student
CSE Department
BVRIT, Vishnupur, Narsapur.

Ms. Pallavi Lanke (2)
Assistant Professor
CSE Department
BVRIT, Vishnupur, Narsapur.

Abstract

Dual-boot Operating Systems is a concept of running multiple operating systems on the same Smartphone Device without any interruptions. For example, with a dual boot you could have multiple operating systems such as Ubuntu & Android or Ubuntu & Windows Phone 8 etc. With Dual-boot as the smartphone device boots a menu will prompt that allows mobile device users to select the operating system that he wish to use either master OS or Slave OS. Once selected, selected operating system will be loaded. Dual booting is the excellent way of making the smartphone device or phablet or tablet useful to multiple users. Dual-boot OS smartphone device is the ultimate convergence device. Users will have the better way of switching the Operating Systems according to the user's requirement.

Dual-boot OS supports the instant switching mode to switch the operating system. Dual-boot Operating Systems will run on both Windows Phone 8 OS and Android OS. It runs on any smartphone device equipped with 1GHZ Dual Core Processor, 1GB RAM and with 4GB ROM. Dual-boot operating systems is easy to install using the custom ROM and Ubuntu OS for mobile ROM.

Dual-boot operating systems is easy to install, deploy, Configure and backup. Enables Multi-Recovery options for os errors and malfunctions. Performance will be stable when device installed with Dual-boot OS. Device boots very fast when compared to the other Operating Systems or ROMs. OS is enabled with device ROM checking, scanning and fixing error mode.

1. Introduction

Dual-Boot Operating System for smartphone is designed to make the phone content easier to access the UI interface and device applications more immersive. Every Smartphone OS has a specific purpose to making all applications, content apps and to get access to the controls instantly without navigating back to the smartphone home screen every time we boot. The Dual-boot OS phone fits perfectly to any user such as beginner user or advanced phone user. The welcome screen on the Dual-Boot Operating System is designed to evolve over time to reflect the smartphone users' user activities on the device. The device Operating System is establishing the bridge between mobile OS and device. In the Dual-boot operating system the smartphone functions as a PC with one of the installed Operating System, Smartphone can also be connected to any monitor and display the Dual-OS on the monitor. When it is used as a dual-boot smartphone, it features a built-in dual boot drive in the Dual-boot Operating System, i.e., Master boot Operating System and Slave Operating System. Web applications can be installed as native applications on one of the dual-boot Operating System. With the help of Ubuntu OS for mobile customizing the own icons is very much possible on the smartphone and the same access to system notifications. Dual-boot OS for mobile enables dual-boot functionality during installation and it also enables to make
your smartphone as like a personal desktop. Many applications can be installed such as Facebook, Twitter, Google Maps, Gmail etc. and it also helps in enabling and configuring the web app API's in operating system. The ability to dual-boot between the two different operating systems seems to be fairly reasonable one. OS uses the simple and the natural swiping gestures techniques from the edges of the screen to make it easier to access the smartphone content than ever and switch between various applications. Every edge of the smartphone is used to move it faster between the pre-installed applications, personal settings, Control panel settings and content settings.

The Dual-OS also supports SDK tool kit for development process and API development. Remote boot-on feature is an add-on feature to improve its remote functionality to access the OS remotely over the internet.

Run local applications and remote applications on a secure smartphone phone running with Dual Operating System. It acts as a new thin client of choice for the smartphones. Dual Operating System also enables the feature to handle the servers from smartphone, also can establish the connectivity with cloud infrastructure and desktops right away from the slave operating system. Basically, Dual-boot option is not set by default, it can be enabled by installing the slave operating system, which is based on Linux Kernel and Linux GUI. With the help of the Dual-OS slave Operating System, it acts as personal desktop running multi-Operating System. It is as smooth as personal desktop.

2. Dual-OS Design Strategy

Dual-OS on smartphone is designed and developed to make all your phone content easier to access more immersive. Two mobile Operating Systems runs well on entry-level smartphones with minimum 512MB RAM. Primary. Both the two operating system uses the same drivers for software compatibility with hardware.

Entry Level smartphones supports the operating system with Linux kernel as a background to install any operating system on the smartphone. The primary Operating System designed in such a way that it creates the multi-boot option on a phone to run current primary Operating System and Android Operating System to run on the same device, For Example: Dual-boot OS in personal computers can run both Windows Operating System and Linux Operating System side by side. Primary Operating System is integrated with Linux GNOME GUI interface to give rich and perfect look on the smartphone. It is designed in such a way that the smartphone is quick responsive to the touch activities on the smartphone. Developed on the basis of Linux kernel to run the primary Operating System and Android OS on the smartphone device. It uses the easy way of switching. Design strategy includes the design of OS running, Content Organization, GUI, Control Management, design and deployment of native applications and design of instant search feature.

- **Always running simultaneously**

Page can be either left or right from the home screen on the smartphone to see the content that you use frequently. Swipe functionalities reveals that a screen showing all the opened application from a full left-to-right display, when swiped from the right brings the screen display with the last applications that you used. Switching between running multiple applications is easier.

- **Content & It's controls Design**

Designed in such a way that Swiping up smartphone display from the bottom edge of the smartphone shows up the application controls. You can hide or show them instantly on the smartphone display, it means they don’t take up the room space on the smartphone home screen. Organize your photos, web pages, music, messages, native applications, installed applications on the smartphone.

- **Web applications & its native apps**

They get their access to the system notifications and own icons. Applications like Facebook, Twitter, Google Apps, Gmail, Web app API's and Mozilla Browser etc.
• **Look and feel**

UI (User Interface) GUI is designed in such a way that UI is quick responsive which is blazingly fast and taking the advantage of the full capabilities of the smartphone’s processor and graphics hardware equipped on the smartphone. Unique design of User GUI give you the gorgeous and distinctive look and feel on the smartphone.

3. **Smartphone Requirements**

The smartphone requirements for running Dual OS is as follows, The entry level smartphone is expected to run with a 1GHz Cortex A9 processor, 512MB RAM, For intermediate level smartphones which is expected to run on 1GB of RAM, 1.6 GHZ Quad Core Processor with a multi-touch display. The high-end smartphone with a Quad-core A9 or Intel Atom processor, with a 2GB of RAM minimum, multi touch, and desktop convergence facility.

The above said smartphone’s hardware configuration is recommended to install and run Dual-boot Operating System on a smartphone.

**Table: 1 Requirements**

| Mobile OS: | Dual-boots (Primary OS and Android OS) |
| RAM: | 4GB RAM |
| ROM: | 4GB RAM |
| Processor: | 1GHZ Dual as an Entry Level processor or 1.2GHZ Quad Core |
| GPU: | ARM MALI or NVIDIA GPU |
| Connectivity: | Dual-LTE, GSM |
| Display Support: | 720 x 1280 pixels resolution, also supports low resolution: 800 x 480 pixels |

4. **Dual-OS Architecture**

<table>
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<tr>
<th>App 1</th>
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<td>APPLICATION FRAMEWORK</td>
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<td>LIBRARIES</td>
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<td>HARDWARE</td>
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**Figure: 1 Mobile Dual-OS Primary Architecture**

• **Hardware Enablement**

Primary and secondary mobile Operating Systems are adapted to run on the chipsets using the ARM and Intel x86 architectures which is relevant for the smartphone devices, with the help of the smartphone core system based around a typical motherboard which enables Support Package (BSP). So the chipset vendors and the hardware vendors maintains the new hardware support packages for dual-boot Operating Systems running on the smartphones.

**Figure: 2 Dual-OS Secondary Architecture**
5. Application Ecosystem

Dual-boot Operating Systems built on world’s favourite Linux distributions. In fact, the thousands of smartphone application developers use it every day, so it’s natural to expect mobile apps to make their way to the multiple mobile Operating Systems.

Providing a fast and uncluttered experience on the smartphone. It can support the traditional Personal desktop computer right alongside the Dual-boot OS Smartphone handset.

5.1 Adaptability

Adapts the web apps or go the native web applications with app APIs that provide the deep integration into the smartphone interface. HTML5 applications are written for the other platforms which can be adapted to the Dual Operating Systems with ease and targeting the cross-platform web applications development frameworks to make Dual-boot Operating Systems to just work for applications.

Unique web applications system lets you to quickly adapt any web property for the deployment of an app on the smartphone, running independently on the smartphone's web browser, with its own icons and will have access to smartphone system services.

But Dual-boot Operating Systems isn’t limited to only HTML5. For the development of rich applications with clear movement and transitions on phone, and compatibility with the graphics based games, it also provides an amazing experience to the native OS developer environment. It also uses the QML, easy to development and development experience for native applications with the system background engines in embedded C, C++, Java and JavaScript for UI (User Interface). It also gives a full native development experience with the OpenGL for gaming performance.

- Apps for all the smartphone devices

Writing applications for all Dual-boot OS compatible devices enables the smartphone users to download and install the applications in seconds of time. With the arrival of Dual-boot SDK, applications can be written into the work on all the OS form-factors, it’s like the same OS on the desktop computer and on the smartphone, so the native applications can work on the both. Which means users can re-use the various app when a user add support for a new form factor in the smartphone OS.

- Cloud Support in Dual-boot OS

The developers can establish the cloud connectivity to the dual-boot Operating Systems by cloud-syncing the data and the databases which provides the APIs to synchronize any kind of data on the cloud. It's a fastest way to develop the cloud based services for the Dual OS users and it also enables developers to develop the integrated, differentiating services for the phone, without any need of maintenance. It features integrated identity management service for smartphone device and it also enables users to manage the identity for service activations securely without any interruption.

6. Characteristics and Advantages

1. Existing of web properties can also be installed on the Dual-boot OS Smartphone, where they can run as web applications on independent of the smartphone web browser with the full access to the native applications on the smartphone.
2. Two Operating Systems runs on single device smoothly on side by side in the smartphone
3. The standard application development environment best fits for developer sdk.
4. HTML5 is fully supported in both the Operating Systems web browser. To use the extreme power of the smartphone's hardware, users or developers can develop the native applications by using the OpenGL, QML, Embedded C, C++ and the JavaScript which is compiled for the ultra-performance.
5. To enhance the Operating Systems with the services, content, applications and Compatibility with the other broader Dual OS app ecosystem.
6. Contents can be surfaced in the home screen and can also search the applications and it can also be pre-installed for branding on the smartphone device.
Multi-Core Smartphones Phones

Now Multi-Core smartphones also supports the dual-boot Operating System and it can also be like PCs too. Multi-Core enables the high-end smartphone handsets to run dual-boot Operating System. So users get the smartphone devices and when they connect their smartphone to a monitor, mouse, keyboard etc. using the OTG Cable then it becomes as a PC. Delivers the next generation desktop into a smartphone device. Drive the adoption of 3G or 4G smartphone handsets, online applications like Google Docs shine and run with the low latency network connections. Connecting the smartphone to the smart desktops by delivering the productivity based desktop applications such as including the managed applications as a service on the inter-network. It also Satisfies the demand for first entry level smartphones with no legacy wired connectivity on a network. Integrate of development is done easily with the Dual-boot OS supporting smartphones.

7. Conclusion

In the entry level and high end smartphones were shipped with the single Operating System such as Symbian OS, Android OS, iOS and Windows Phone OS.

But the current concept explains that a Dual-boot Operating Systems can be installed and used on the entry level and high-end smartphones equipped with minimum hardware requirement of Cortex A9 1GHZ Dual core processors and Quad-Core Processors with minimum 512MB RAM. Smartphones are capable of running Dual-boot Operating Systems without any problems.

For Example: An entry level smartphone is capable of running Dual-boot OS such as Firefox OS and Android OS on a capable smartphone device, just like the personal computers running with Windows OS and Linux OS. Both the dual-boot Operating Systems will be user friendly for the smartphone users. Running the Dual-boot Operating Systems in smartphones is the innovative way of using the mobile technology.

We hereby conclude that installing and running Dual-boot Operating Systems in smartphones is very much possible.

8. References