

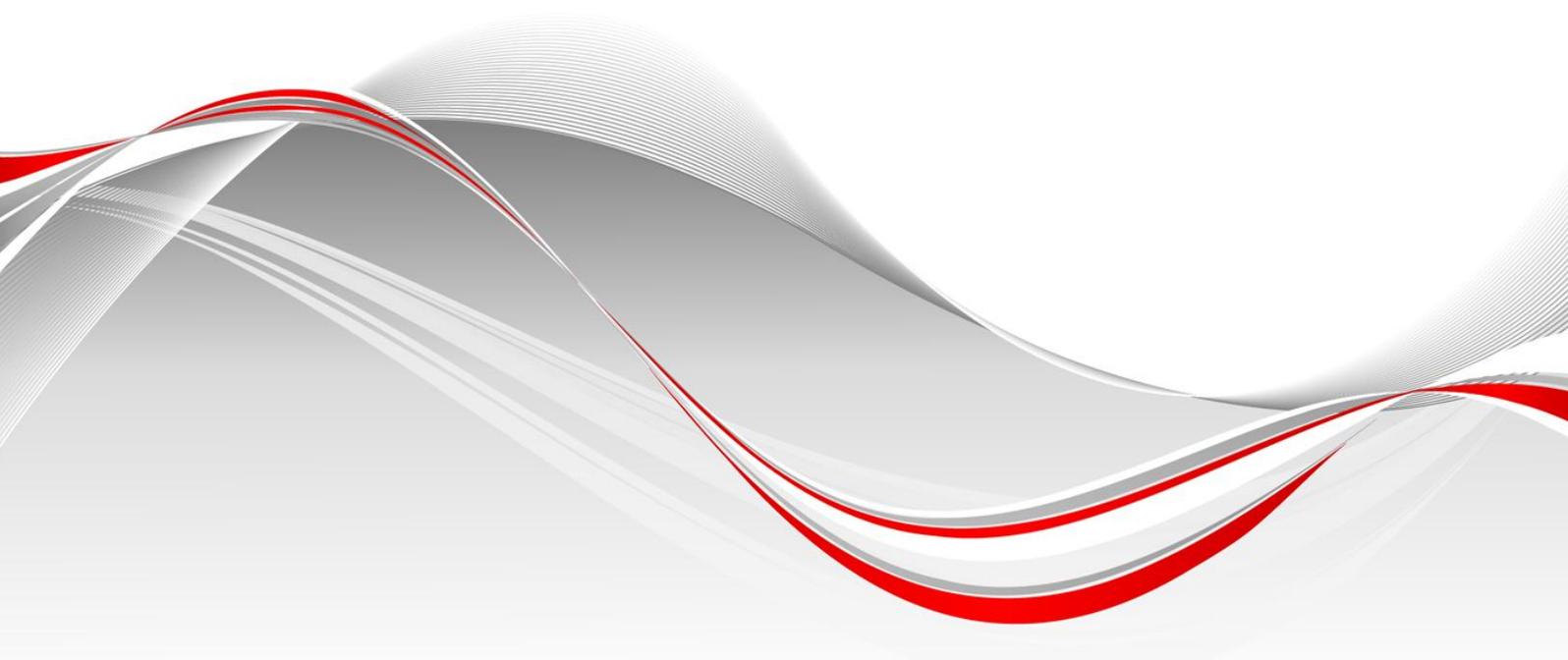


OTA Updating Simplified

Using SaaS to Update Android Device OSs and Applications

White Paper

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1 Introduction

Ensuring that smartphones and tablets can be updated is one of the most important features of mobile devices today because successful updates directly correlate with the daily performance of the device and a positive user experience. As Android becomes more and more popular and the preferred OS choice for smartphones, tablets and many other non-mobile devices, like smart watches, ruggedized devices, cameras, TVs and others, having an over-the-air (OTA) update capability has become essential to every new Android manufacturer. In the [words](#) of Internet blogger Jerry Hildenbrand, “Nothing pleases Android fans more than a notice that they have an update.”

This whitepaper is intended for Android device manufacturers interested in offering an OTA software updating service to continually delight customers with the latest version of Android as well as features and performance improvements. It describes the importance of delivering software updates and explains how it has become an integral part of a manufacturer’s go-to-market strategy. The paper discusses the technology, expertise and service infrastructure needed to ensure reliable and efficient software updates to devices used both by consumers and enterprises. By reading this white paper, Android OEMs will learn how to easily offer an OTA software updating service and gain a competitive edge in the crowded consumer electronics market.

2 The Growing Expectation for Software Updates

Android is the most widely adopted mobile platform and it benefits from a global ecosystem of developers who contribute to continually improving Android’s features. The result is that new versions of Android are being generated two-three times each year and software updates must be provided to the installed base to keep the Android ecosystem on the same baseline in order to sustain the rapid pace of innovation. Android device manufacturers realize that consumers expect the OEM to keep the device updated to the latest version so they benefit from the constant innovation and new functionality.

All the leading mobile brands provide regular software updates, known as firmware over-the-air (FOTA). Yet, many new device manufacturers do not yet have an OTA updating strategy, leaving the challengers at a significant disadvantage. [Alex Dobie](#), managing editor of Android Central, agrees that “... having to wait longer than you’d like for an update is never a good thing. Customers don’t care about why their shiny new Android phone is one or two versions behind the latest.”

The good news is Android device manufacturers no longer need to build their own service infrastructures in order to deliver OTA software updates. There is a Software as a Service (SaaS) approach that simplifies the update delivery process by harnessing the power of the cloud and combining it with Red Bend's premium FOTA technology used by the big mobile brands in more than one billion smartphones and tablets.

3 Update as a Strategy

From the consumer's point of view, a software update is an enhancement to the current operating system version containing new features and performance improvements. However, from the manufacturer's point of view, a software update is an opportunity to communicate with consumers, to not only satisfy expectations, but potentially delight them with a continuously better user experience that can differentiate the OEM from the competition.

There are several approaches OEMs can take when creating an update strategy:

1. Insurance Policy – integrate FOTA capability to avoid a costly product recall in the event of a severe software defect, but do not commit to ongoing new firmware versions OTA
2. Check the Box – list OTA updates as a device feature, and then update devices to the next major Android version within four-six months of the new version being released
3. Parity with Big Brands – promote a commitment to keeping the device up to date, and deliver both major and minor Android OS updates within two-three months of being released
4. Software Updates as a Differentiator – customize Android with unique features and applications that give the OEM a differentiated user experience, and regularly deliver updates that make the device continuously better throughout its lifetime

There are constant online discussions in the Android community about OEMs' commitment to providing updates. It is evident that companies that are late in releasing an update or that fail to keep their update commitments receive heavy criticism resulting in customer dissatisfaction. On the other hand, those OEMs which use OTA software updating as a strategy to maintain a positive relationship with their customers benefit from stronger brand loyalty that can lead to lifelong relationships and repeat buyers.

4 Update Infrastructure: On-Premise or Over-the-Cloud

The ability to create and distribute updates, in some cases on a global scale, requires a closer understanding of the technology, infrastructure and expertise OEMs need in order to successfully manage this complex operation.

All of the leading brands that sell smartphones and tablets by the millions have their own infrastructures and processes to regularly deliver software updates OTA. They have large R&D departments that constantly work on product improvements and also incorporate Android operating system releases from Google into their customized versions of Android. To that end, these manufacturers usually have a defined software update roadmap and they also have the required technology, server and network infrastructure to send and perform updates across all devices. The following are some of the key ingredients required for a successful FOTA service:

- **FOTA Update Generator** – A PC-based tool that creates the update to be sent OTA to the device. It identifies the essential changes between the existing firmware version and the new, updated version, and creates an extremely compact update file, called a delta package, of these changes. The FOTA Update Generator creates delta packages of a device image and its file system, which typically stores images, sounds, configuration data, settings, design themes, icons, menus, system status, and other information that affects device appearance, configuration, and branding.
- **Communications Protocol** – Once the delta package is created, the file is sent to the device using a communications protocol. A back-end software management system, owned and hosted by the OEM, uses this Communications Protocol to allow OEMs to centrally manage firmware, applications, and device settings over the air. The OMA DM (Open Mobile Alliance Device Management) standard is the common protocol used to communicate between the management system and an OMA DM client on the device. This protocol, which is optimized for mobile communication, provides as part of the standard, all the management aspects of the software update process including key security functionality and the ability to perform device provisioning (bootstrap).
- **FOTA Update Installer** – Once the delta package is successfully received by the OMA DM client on the device, it is installed using a FOTA Update Installer. This software is pre-integrated into the mobile device before it ships into the market in order to perform the firmware update installation. Optimized for the limited memory available within a mobile device, it applies the updates in-place on the device's firmware accurately and reliably. It performs this update on

devices with monolithic firmware images and on smartphones with compressed, multi-section images. The FOTA Update Installer also performs file system updates. The FOTA Update Installer must perform the operation in a 100% reliable and fail-safe manner, otherwise the OEM will risk “bricking” devices in the field. In addition, it must perform the operation quickly and easily, to minimize time the device is off-line and to avoid any confusion that may trigger a customer service call.

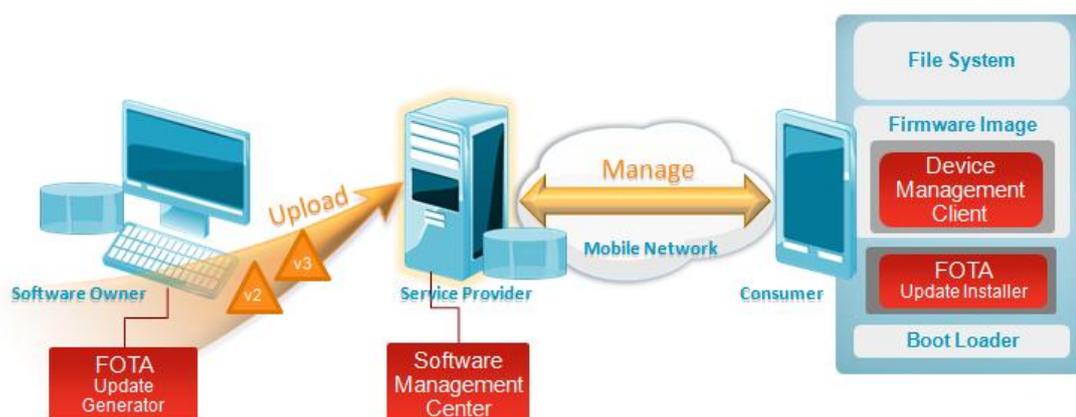


Figure 4-1: Overview of a FOTA System

While they may not have equal resources, smaller Android OEMs that manufacture fewer device models that ship in the tens or hundreds of thousands must still have an OTA updating strategy in order to compete successfully. However, typically these OEMs have less R&D than the big players and lack the in-house expertise to execute such an update strategy. In addition, because their volumes are lower, they may operate on thinner margins, and therefore may lack the same financial resources as larger competitors needed to build-out their own update infrastructures.

Instead of investing in their own OTA infrastructure or to reduce the cost and improve the performance of an existing in-house system, Android OEMs instead can leverage the cloud to deliver firmware updates OTA using SaaS. In this model, the software management system and the FOTA update generator are hosted in the cloud.

5 Using Software as a Service (SaaS) to Update Android Devices

Software as a Service (SaaS) is a simplified approach to enabling Android OEMs to easily offer OTA updates. It eliminates the need for manufacturers to invest in setting up and operating their own

server and network infrastructure. In addition, it is more cost-effective particularly for smaller OEMs that ship in relatively lower volumes.

Red Bend Software's *OTA Updating Service for Android* offers a SaaS model using Red Bend's leading FOTA software, [vRapid Mobile®](#), adopted by more than 80 customers including major mobile phone and tablet manufacturers, automotive OEMs, semiconductor vendors and tier-1 mobile operators, and shipped in over 1.75 billion mobile devices worldwide.

Red Bend's [OTA Updating Service for Android](#) enables OEMs to reach out to their customers and ensure they have the latest software on their devices from the moment it comes out of the box to the moment the consumer decides to buy a new device, helping to strengthen brand loyalty in the crowded Android market. Users also can proactively maintain their device software by pulling new updates and thereby updating their devices on-demand, securing their investment in their device and appreciating their OEM's support in making their device continuously better.

Following the easy integration of Red Bend's on-device software clients before the device ships, all campaign activity is done via a web interface. Red Bend operates a highly available cloud infrastructure and offers global support in creating and performing software updates. The service can be activated quickly, and manufacturers get the benefit of a SaaS model without sacrificing control, flexibility or reliability of an on-premise system.

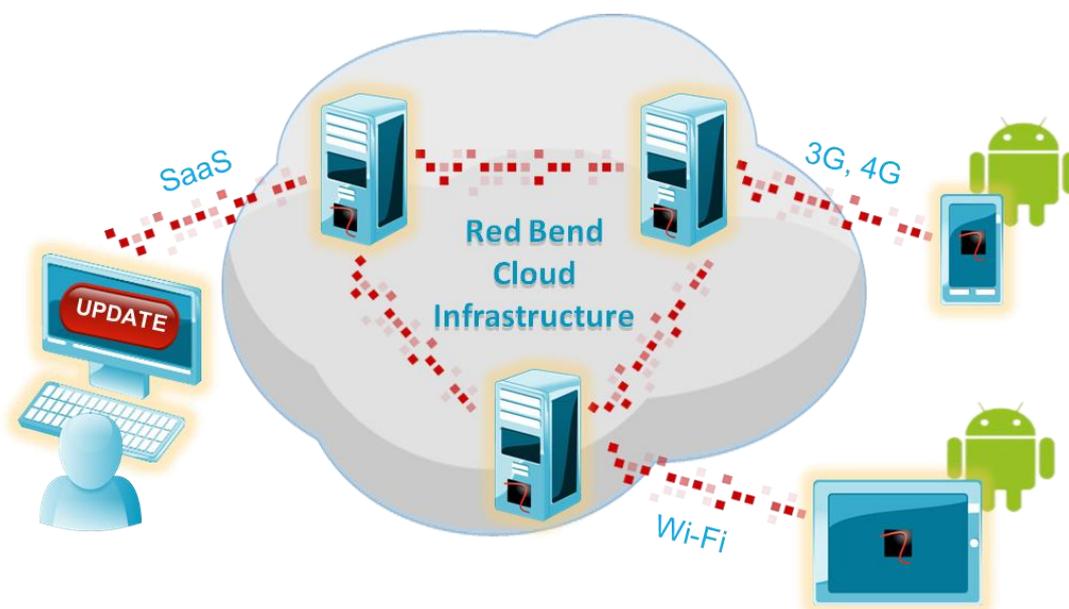


Figure 5-1: Red Bend's OTA Updating Service for Android

The benefits are clear: update firmware anywhere in the world at any time during the device lifecycle, enjoy a low-cost service model, avoid unnecessary investment in hardware that is not core to the business and maintain high customer satisfaction.

6 Summary

A common saying is that “big things come in small packages.” This is very true for Android OTA software updates, which are like new presents coming throughout the year that delight Android users. Consumers expect their Android device to always have the most recent firmware version with the latest innovations coming from the Android ecosystem. OEMs that do not provide OTA updates are at a competitive disadvantage and risk customer dissatisfaction.

To provide an OTA updating service, Android OEMs can develop their own infrastructures in-house, which requires significant investment and expertise, or they can use a SaaS service such as Red Bend Software’s *OTA Updating Service for Android*. Leveraging a SaaS model simplifies the process of OTA updating without sacrificing control, flexibility or reliability. By providing software updates OTA, device manufacturers can create a positive touch point with consumers to not only satisfy expectations, but keep them happy with a continuously better user experience that builds long-term brand loyalty.

7 About Red Bend Software

Red Bend® Software, the leader in Mobile Software Management (MSM) with more than 1.75 billion Red Bend-Enabled™ devices, makes mobile devices and services continuously better in a rapidly changing world. Red Bend is the only company that provides standards-based products and solutions for software management, device management, and mobile virtualization that work on any mobile phone and connected device uniformly, efficiently, and securely over the air. Red Bend enables its customers to stay competitive in a fast-moving market by helping them deliver high-value services on an increasing number of connected devices with growing software complexity. More than 80 leading device manufacturers, mobile operators, semiconductor vendors and automotive companies worldwide trust Red Bend with their most important assets—the mobile and connected devices their consumers depend on. www.redbend.com