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# Android, the next frontier in medical device development

*Android presents great possibilities for medical device developers, especially when developing the next-generation of mobile healthcare.*

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*By Chris Fitzpatrick*

In November 2007, Google released Android as an operating system (OS), targeted primarily at smart phones. Since then, we have witnessed its phenomenal success. It is now the most popular OS for smart phones in the world.

While most industries have leveraged Android in various ways, the healthcare industry has lagged behind. This is not entirely surprising because, generally

speaking, the healthcare industry is slow in adopting new technologies such as this. A reason is the highly regulated nature of the industry, which leads to a tendency to wait for a technology to mature before adopting it. But in the past few years, interest and adoption of Android as the operating system (OS) for medical devices development has grown dramatically. QuEST has recent experience developing a wearable device, including its Android based application.

While developing this application, there were two factors that influenced the Android OS selection. First, Android-based devices are gaining wide acceptance in the industry and second, the user experience it can provide is superior. In addition, healthcare practitioners are generally quite comfortable with Android based devices in their personal lives.

There are five key benefits driving the growing popularity of Android in the medical device developer community.

Better user interface and user experience

Traditional medical device software has a sub-optimal user experience. Nearly all embedded systems in medical devices use proprietary technologies that require the developer to roll-out their own graphic user interface solution. Developers focus on the core functionality of the device and the design and display of the user interface falls low on their priority list. But poor usability affects the overall use and benefit of the product. Android addresses this as it provides layout tools for the developers to build the UI/UX for the system.

Open-source, stable, and proven

Android is proven; millions of phones run the same Android stack. As an open source software, Android offers the advantage of a large readily available pool of users finding bugs, and a large developer community dedicated to fixing them, supporting faster development, debugging, and testing of the software.

Easy to work on, access to a large pool of skilled professionals and cost effective

Android development is not overly complex and a large pool of developers can support Android. Being open-source, it is cost effective as well.

Advanced networking and communication out-of-the-box

As an OS primarily developed for smart phones, Android focuses on device communication and networking. It has massive and complete libraries for a variety of wired and wireless communication protocols. It supports and has drivers for a large amount of radio devices from prominent manufacturers as well. The networking capabilities coupled with the Android middleware and Java tools open up exciting new possibilities for data exchange and interoperability.

The advantage of touch screen

Android is an operating system developed specifically for touch screens. In the past, medical device developers faced challenges in developing touch screen interfaces. But Android makes it easier to design and develop. While there are clear benefits of Android, there are also challenges. Medical devices differ from other devices as they can pose a risk to the user and the end beneficiary of the technology, the patient. The FDA classifies all medical devices into three classes - class I, II and III, based on the risk to the patient and the degree of regulatory scrutiny it believes is warranted. Being a fairly bulky OS, Android tends to experience failures more frequently than smaller and easy to test OSs. Smaller OSs are also more reliable. In addition, a key requirement with medical devices is an "always ready" experience. So, while the need to reboot once a year to fix a software lockup may not be a concern for many devices, it is a big concern for a medical device, especially a class III device such as an implantable defibrillator.

Android is therefore more apt to be used in class I and II devices while smaller, high-

reliability OSs work better for class III devices. With that said, any medical device development effort must thoroughly consider and understand the risks introduced by OS selection, irrespective of device classification.

## Gaining ground

Without a doubt, Android presents great possibilities for medical device developers, especially when developing the next-generation of mobile healthcare. But when it comes to successfully managing the challenges that it presents, it is important to consider and mitigate the risks. One way to tackle this is to find a strong partner - a partner that has the resources and expertise to help device manufacturers develop and deliver next generation technology to the market.

(By Chris Fitzpatrick, Vice President - QuEST Global)

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