Barriers To Adopting Wireless Healthcare

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Mobile healthcare (mHealth) is tipped to be one of the hottest trends for 2012. Indeed, a report from the World Heath Organisation (WHO), ‘mHealth – New Horizons for Health Through Mobile Technologies’, recognises that the use of mobile and wireless has the potential to transform the face of health service delivery across the globe. In the report, 83 per cent of member states reported offering at least one type of mHealth service, with many countries offering four to six programmes.

With the WHO survey showing that two thirds of mHealth programmes are in the pilot or informal stage, there is significant potential for the design community to benefit from the anticipated explosion in demand for mHealth by developing a wide variety of new apps. The recent World mHealth Congress illustrated the plethora of more than 10,000 healthcare apps that are available, but adoption appears sporadic. With so many to chose from, how do the public know which apps are most suitable?

There is a fear that oversights in the development of mobile medical apps will present risks to patients if the networks fail to work effectively. The Food and Drug Administration (FDA) is proposing guidelines for medical app development, which will oversee medical apps that are used as an accessory for an already FDA-regulated device or transform a mobile platform into a regulated device.

However, with the agency predicting that over 500 million smartphones users will be using a medical app by 2015 and the remit of the guidelines not including the network integration, the big question is whether the current mobile networks will be able to cope with the growth in end-user apps, and how could those limitations be tackled effectively?

Of course as demand on mobile data services increase, so the strain on network capacity may result in a decrease in real-time service reliability. Already something many mobile phone users are familiar with, it is currently nothing but an

annoyance, but is certainly not acceptable for potentially life-saving medical apps, or those that provide geolocation monitoring for wandering patients. This means that the current network limitations cannot guarantee that a patient's wireless medical device will work anytime and anywhere.

Part of the issue is that many application developers do not understand the complexities of mobile network access, with the result that many embedded device apps are written in a way where they constantly make and break connections that cause more signalling than the network can realistically support. The result is a network congested by signalling long before the actual data throughput limit is reached.

Smart thinking

So, how can the networks cope with the potential huge volume of data as mHealth becomes increasingly commonplace?

In order to cope with the costs of developing their infrastructure to stop bandwidth overload, mobile networks are already considering intelligent charging plans to smooth out the load on the network throughout the day. Such an approach makes it feasible to charge differently for data depending on its nature (e.g. video or sensor upload), as well as the time of day or location from which it is sent.

This would give the healthcare industry the opportunity to negotiate data plans according to the value of the services provided as not all data will have the same priority, which means that some can be delayed whilst other data is needed urgently. For example, adverse physiological monitoring data for a patient with Chronic Obstructive Pulmonary Disorder would be prioritised over automated drug compliance data.

Encouraging developers to set the expectation of data transfer ‘only when really needed’ is therefore a fundamental requirement in making this paradigm shift, enabling the data that is not urgent to be aggregated and sent in bulk at a time of day when the mass demand on the network is low. The immediate effect of this is a reduction in signalling load – something the mobile networks should welcome with open arms. However, ensuring that all of the aggregated data is not scheduled for a common off-peak time, such as midnight, is of course the next challenge.

Dynamic control of the sending of off-peak data could therefore be the answer. This is intelligent management, which moves data to and from the wireless medical device using delayed and aggregated data transfer. To be effective, matching the priority of the data to a mobile network’s preferred times, such as a pre-agreed off-peak schedule, will be required. If a mobile device can separate data into real-time and non-urgent classifications, it can then be configured to use the wireless service at a time when the data cost is lower. Of course, a key benefit of this approach is that the healthcare organisation will be able to control data costs within reimbursable limits.

This ‘smart thinking’ can be achieved by a connection manager in the device that automatically connects the demands of the data-sending applications with the needs of the mobile network through its billing, charging and traffic management policy solution.

With such a connection manager in place, the end-user’s mobile application is only concerned with prioritising its data, with the decision of when it is more cost effective to send made by the connection manager. When there is non-urgent data to be sent, but the network policies indicate it is not most cost effective, the application can aggregate the data. The connection manager can then inform the application when the conditions change and it is now acceptable to send non-urgent data.

By pushing policies to a connection manager in this way, mobile network operators have arms-length control of the deployed devices and can influence the end-user’s application without annoying their customers or limiting what they want to do.

The example of a diabetes patient who is fitted with a blood glucose monitor will help us to understand the benefits derived from segregating data in this way. Under normal circumstances patient data can be delivered at a time of day when charge rates are low. However, if the application recognises that the patient's situation becomes critical, data would be delivered immediately.

Another problem is that the quality of network connectivity is impossible to predict. For example, at sports events the networks are heavily congested and the quality of service drops due to the sheer number using the local cell. This could mean that critical medical data would fail to arrive in the required timeframe for anyone at the event who relies on their medical device to keep track of their state of health.

Similarly, network black spots are another challenge to overcome. One answer is more mobile base stations in order to ensure consistent coverage in all areas, even the most remote, so that mHealth solutions can be delivered countrywide.

mHealth devices will also become more reliable if they are able to make more than one connectivity choice, such as the mobile network or WiFi. Developers must therefore build in connectivity intelligence that automatically selects the connection mode that will maximise results for the end-user without them having the technical know-how to do complex interactions with connectivity parameters themselves.

A healthy future

The development of intelligent data management will provide a ready-made method of managing cost, battery life and user experience, while effectively combating the issue of network bandwidth overload. With the development of smart apps that meet user expectations and reliably deliver health-critical data within the confines of network bandwidth, the long-term prognosis for mHealth is bright. [1]

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