

---

# Accelerating innovation for healthcare applications with cloud-based voice and messaging

---



## Introduction

The provision of healthcare is undergoing a profound revolution. Faced with escalating costs and growing patient needs, providers are trying to ensure continued excellence while optimising cost structures and delivery mechanisms. At the same time, patients have adapted to an always-on world and demand more timely information, better access to care, and more sophisticated solutions. Technological evolution is fundamental to these changes – on the one hand enabling providers to do more, more efficiently; on the other, democratising and facilitating access for patients.

Put simply, healthcare provision is shifting from the traditional, episodic model to a new patient-centric and continuous care paradigm. While this presents challenges to healthcare providers that must adapt to new models and rapidly deliver appropriate and relevant solutions, it also presents considerable opportunities for the provision of solutions that enable more efficiency to be realised in healthcare services and greater accessibility that capitalizes on changes in communications technology.

# Accelerating innovation for healthcare applications

With cloud-based voice and messaging

## The key factors driving innovation in healthcare

Just as traditional models are evolving, so too is the technology that will support future service delivery. This means that the boundaries between traditionally siloed healthcare applications are blurring, as innovators seek to blend capabilities to create valuable new functionality and unlock latent potential. This innovation is driven by four key factors:

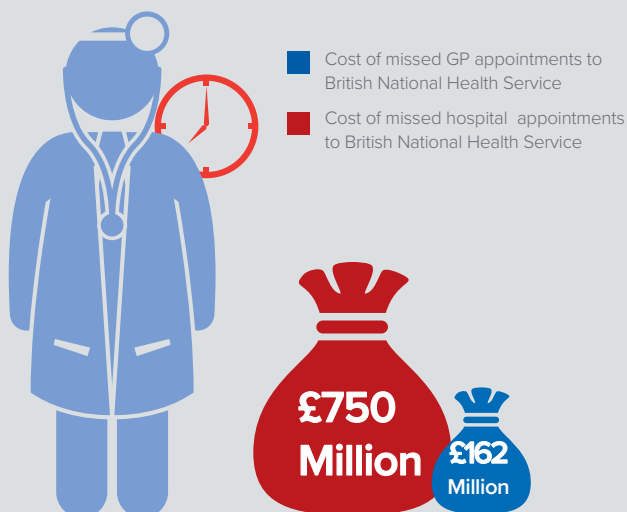
1. Maturity of Communications Enhanced Business Processes (CEBP);
2. The rise of the Internet of Things (IoT) creating millions of connected devices;
3. The explosion of cloud computing; and
4. The widespread availability of (Application Programming Interfaces) APIs that enable applications to share resources and access rich functionality.

This paper explores shifts in the provision and enablement of medical care and examines how technology will shape enhancements in accessibility, efficiency and delivery.

## The role of IVR, Voice and Messaging

Communication between patients and providers was, for many years, simply a linear process. Patients would telephone providers to schedule appointments, contact emergency services and discuss issues. Similarly, providers would use basic voice connectivity to provide information to their patients.

With the widespread deployment of IVR systems that began more than 20 years ago, greater interaction possibilities were enabled for patients and providers alike. Users could select from a range of options, helping to refine queries and increase the efficiency of responders in addressing them. In turn, IVR was enriched with speech recognition, allowing the creation of more powerful solutions that accelerated interaction and improved the user experience.



To use a simple example, most local clinical practices today use an IVR and call queuing to enable patients to contact administrative staff, schedule appointments and manage enquiries. Larger facilities will use call centre technology in order to manage larger volumes of inbound calls.

However, at the same time, additional benefits were promised. By capturing information from callers, it was anticipated that such data could be provided to other systems.

For example, information about specific appointment times could be automatically delivered to the scheduling system for practitioners while also being added to individual patient records. With the addition of the now ubiquitous messaging, an additional communications process could also be incorporated, allowing the automation of reminders to patients and staff alike.

*“The potential of such enrichment took some time to emerge but, today, it is commonplace for an initial voice call to a practice to trigger updates to records, calendars and to generate reminder messages for patients.”*

# Accelerating innovation for healthcare applications

With cloud-based voice and messaging

The potential of such enrichment took some time to emerge but, today, it is commonplace for an initial voice call to a practice to trigger updates to records, calendars and to generate reminder messages for patients.

This has numerous benefits. According to reports from the BBC in July 2015, the cost of missed hospital and general practitioner appointments to Britain's NHS has approached 1 Billion GBP1 . The worldwide figure is likely to be many times greater. Clearly, greater efficiency in appointment setting, reminders and enabling easy cancellation (and thus reallocation of resources and rescheduling), could help realise considerable savings.

Effective IVR integration, therefore, has huge significance as healthcare providers seek to use resources more efficiently and save costs, let alone realise benefits for patients. But this is merely the tip of the iceberg. Voice and messaging, while once the primary means of communication, should actually be seen as enablers that complement other channels and information systems. They are contact points, and the means for distribution of information to individuals, but they have become extensions of emerging solutions that leverage new technology and ideas rather than the heart of such systems themselves.

```
<?php
declare(encoding='UTF-8');
spl_autoload_register();

use \Aculab\TelephonyRestAPI\MessageWebService;
use \Aculab\TelephonyRestAPI\Message;

$MyService = new MessageWebService( CLOUD_ID, CLOUD_USERNAME, CLOUD_PASSWORD);

# Details for contents of my message
$from = "15557092312";
$to = "19170123456";
$text = "Hello Mr Smith, A reminder that you have an appointment at the hospital with Doctor Jones on
September 20th at 9:10am. Please call (555) 709 2300 to change or cancel";

$MyMessage = new Message($from, $to, $text);

# Set the page to which status updates will be sent
$MyMessage->setStatusPage('http://myserver.com/sms_status.php');

$MyService->sendMessage($MyMessage);
?>
```

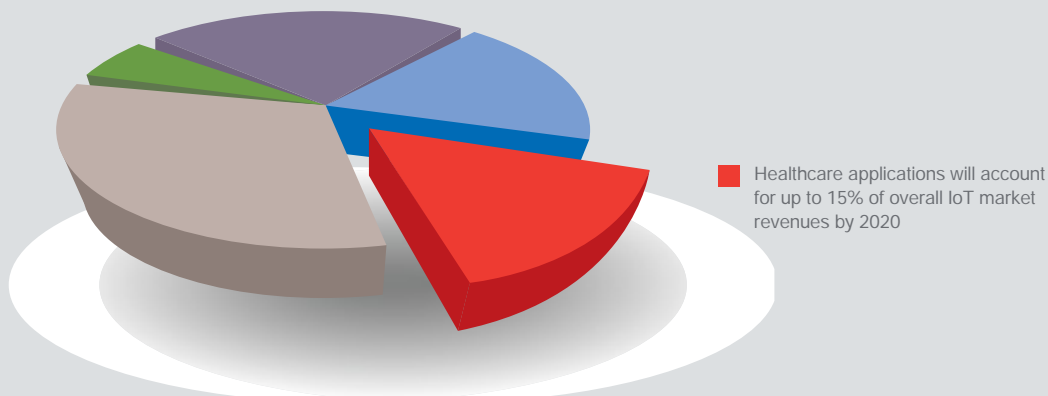
**SMS appointment reminder:** A simple SMS appointment reminder, built in PHP using Aculab Cloud

# Accelerating innovation for healthcare applications

With cloud-based voice and messaging

## The impact and implications of the IoT

The Internet of Things has, rightly, attracted considerable attention. Driven by the growth of connected devices, forecasts vary considerably regarding the IoT market's revenue potential. Despite variation from a relatively modest \$300 Billion to a gigantic \$7 Trillion a year revenue opportunity by 2020, this is clearly an attractive marketplace. Of more interest is the fact that healthcare is recognised as a key segment within overall IoT markets, with estimates for its relative share ranging from 5 – 15%.



**15% of a possible \$7 Trillion market:** The opportunity for IoT healthcare applications

This is because it is now recognised that many aspects of healthcare can be delivered and enhanced through remote monitoring and reporting. An increasing array of devices is now available that collect data from patients, remotely, avoiding the need for visits to practitioners in hospitals and clinics.

Thus, systems can be enabled that send updates on pulse rate, blood pressure and other vital indicators to healthcare providers. Such monitoring is important, because it reduces the number of inpatient hours required, thus reducing provider costs and inconvenience to patients. Although in its infancy, remote patient monitoring shows much promise and is viewed as a priority for many providers. It is also a key enabler for the delivery of healthcare to remote areas with limited infrastructure.

There is a clear need for such systems to support a broader range of functionality. Consider a solution that collects and aggregates reports from common devices such as pacemakers. If an irregularity in a patient is detected, then emergency alarms need to be activated in order to ensure that appropriate action is taken. This can include the automatic ordering of emergency capabilities, it could also include an automated call to the patient, to practitioners, family and so on.

Even without considering emergency intervention, IoT applications that are created for healthcare systems will benefit from the inclusion of communications capabilities. Systems that combine remote reports and data from IoT devices with the capability to communicate, when appropriate, with humans via, for example, the transmission of automated messages or pre-recorded announcements, are likely to play an increasing role in the practise and delivery of medicine. Voice and messaging are thus key enablers in this context, but they are subordinate to the overall purpose of the monitoring system.

*"...healthcare is recognised as a key segment within overall IoT markets, with estimates for its relative share ranging from 5 – 15% ."*

# Accelerating innovation for healthcare applications

With cloud-based voice and messaging

## Information Delivery and Integration – CEBP for Health

In any healthcare organisation, there are numerous IT systems. Whereas many have been delivered as individual platforms, integration between different solutions may yield as yet unforeseen benefits. Notwithstanding privacy issues, the ability to share information has already yielded benefits in customer facing applications, such as IVR and call centre functions. This is simply the beginning of a more integrated approach in which data is shared between devices, databases, processes and more. Communication is likely to play a key role in efforts towards integration, which, in turn, will lead to the convergence of many existing silos.

This can generate further efficiency benefits. Recently, much attention has been paid to a growing trend for the enablement of CEBPs. Such initiatives seek to create efficiencies and extract greater value from processes by combining common enterprise applications, such as Customer Relationship Management (CRM) solutions, with communications capabilities.

An example might be a CRM solution that is enabled with speech recognition technologies, enabling customer records to be accessed and summoned by voice, and then delivered via email or directed towards some visual display.

Imagine the potential for such applications in an operating theatre, for example. A surgeon could view patient records during a complex procedure in a sterile environment simply by asking for them. Similarly, a practitioner could request access to case histories by the same process. Conversations between practitioner and patient could be stored for retrieval. Prescription updates generated, sent to pharmacies and patients informed of their availability.

If a member of staff is absent, this can be processed via an IVR, the information extracted and sent to the relevant Human Resources (HR) systems, such that patient appointments can be rescheduled or an alternative practitioner allocated. At the same time, the replacement could be automatically alerted or patients informed by messaging alerts of a change of schedule.

And this is the interesting thing. We can easily conceive of the utility of many of these applications. We can just as easily conceive of many more, but we must recognise that they depend on the availability of open APIs to different systems and the innovation of application developers and systems integrators to connect them together into something useful. Further, many of these capabilities are likely to be hosted in the cloud.

However, the integration of communications capabilities depends further on the availability of on-demand, secure, robust and highly scalable platforms that can deliver voice processing and messaging capabilities with connectivity to any network.

```
my_actions.add(Play (text_to_say = "Thank you for calling Aculab "
" Healthcare. Please choose from the following options"))
my_actions.add(Redirect (WebPage(url='after_intro')))
return my_actions.get_json()

my_actions = Actions()
my_actions.add(Play (text_to_say = "Main menu. "))

main_menu = RunMenu ()
menu_text = ("Press 1 for appointments, press 2 for test results, press " " 3 for
pharmacy, press 4 to hear our surgery location and opening "
" times, or press 5 to speak to our receptionist. "
" At any time, just hit star to hear the options again. ")
main_menu.on_prompt_play (Play(text_to_say = menu_text))
main_menu.append_menu_option('1', WebPage(url='appointments'))
main_menu.append_menu_option('2', WebPage(url='test_results'))
main_menu.append_menu_option('3', WebPage(url='pharmacy'))
main_menu.append_menu_option('4', WebPage(url='opening_times'))
main_menu.append_menu_option('5', WebPage(url='connect_agent'))
my_actions.add (main_menu)
return my_actions.get_json()
```

**A simple IVR menu: Written for REST API in Python**

# Accelerating innovation for healthcare applications

With cloud-based voice and messaging

## Unleashing Innovation in Healthcare

Four key trends have coincided that will have created the optimum conditions for unleashing innovation in healthcare. First, CEBP as a practice has matured. Already, across industry verticals, an increasing number of enterprise applications now incorporate communications capabilities. The future, as some analysts have pointed out, is that communications will likely evolve to become a more contextual experience, in which it is a capability that is called upon from time to time, depending on circumstances, triggers and the like.

Second, the rise of the IoT is creating a wealth of new devices that must collect and transmit data, many of which will be orientated towards healthcare applications, both remotely and in care facilities. Third, the explosion of cloud computing has created an environment in which powerful, scalable resources are available at lower cost and accessible via the web.

Fourth, more and more services and applications have become API enabled. It is difficult to imagine a new resource that does not come ready equipped with an API interface available to developers. Today, there are more than 900 APIs that have been exposed by applications that are available in the healthcare domain. These APIs are the key to unleashing the innovation required by the evolving healthcare paradigm.

The implications of this are clear. The resources and capabilities are in place to enable a wave of innovation for healthcare applications. We do not yet know what many of these innovations will be. Developers will capitalise on opportunities in healthcare to create new use cases, extend functionality and converge services. To support this innovation, developers need access to an advanced, cloud-based voice and messaging platform, with APIs that enable integration into any application. Such a resource is Aculab Cloud.

“

9ZkZæZghčZZY\XXXZhñd\vc\vykvcXZYžXaj Y!WhZYkd\XZ\vcY~  
b ZhhV\ ĉ\ ěđ/i[dgb žl ħ] ůE ħĩ] Vi ZcVWž ĉiZ\g/iđc ĉid\vcn~  
VeeXViđc#Hj X] Vgžhdj gZ ħ ůXj đW8aj Y#

”

# Aculab Cloud

Three decades of innovation — in the cloud

## Leverage the heritage of Aculab when you move to the cloud

Moving your application development environment to a cloud infrastructure is a big step. Despite the clear benefits of cloud migration, it's natural for developers of hardware-based solutions to be concerned about the risks of moving their technology IP — and the years of investment and knowledge that has gone into creating it — to a new cloud development platform. Most of the big names in cloud communications are relatively new entrants to the communications market; some are working with open source technologies and, as the market consolidates, it is likely that many will not be in business in just a few years' time.

So how do you know that a cloud platform can deliver the same level of reliability and performance that you've come to expect from a hardware deployment, and that it will be around for decades?

## Three decades of innovation — the next chapter

Aculab Cloud deploys Aculab's industry benchmark technology and has been built organically out of more than 35 years' worth of experience in the communications enablement market. Put simply, it's the result of more than three decades of experience and innovation.

Aculab Cloud developers can be assured that the technology that powers Aculab Cloud has been used to enable tens of thousands of mission-critical applications across the world. Aculab Cloud features robust, field-proven protocols that have been developed and honed in conjunction with thousands of developers and deployed across hundreds of networks.

It's the only cloud communications platform that delivers the expertise, experience and reliability that you get from working with a proven communications enabler.

Leverage our heritage when you move to the cloud.

“...how do you know that a cloud platform can deliver the same level of reliability and performance that you've come to expect from a hardware deployment, and that it will be around for decades?”

## About Aculab

Aculab provides deployment proven telephony products to the global communications market

Whether you need telephony resources on a board, on a host server processor or from a cloud-based platform, Aculab ensures that you have the choice. We are an innovative, market leading company that places product quality and support right at the top of our agenda. With over 35 years of experience in helping to drive our customers' success, our technology is used to deliver multimodal voice, data and fax solutions for use within IP, PSTN and mobile networks – with performance levels that are second to none.

## For more information

To learn more about Aculab Cloud and Aculab's extensive telephony solutions visit:

[www.aculab.com](http://www.aculab.com)

---

## Contact us

### Phone

+44 (0) 1908 273800 (UK)

+1 (781) 352 3550 (USA)

### Email

[info@aculab.com](mailto:info@aculab.com)

[sales@aculab.com](mailto:sales@aculab.com)

[support@aculab.com](mailto:support@aculab.com)

### Social



[@aculab](https://twitter.com/aculab)



[aculab](https://www.linkedin.com/company/aculab)