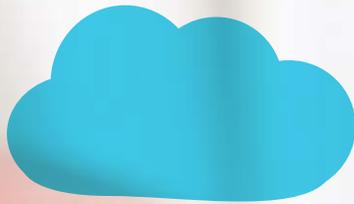


A new era for the healthcare industry

Cloud computing changes the game



High performance. Delivered.

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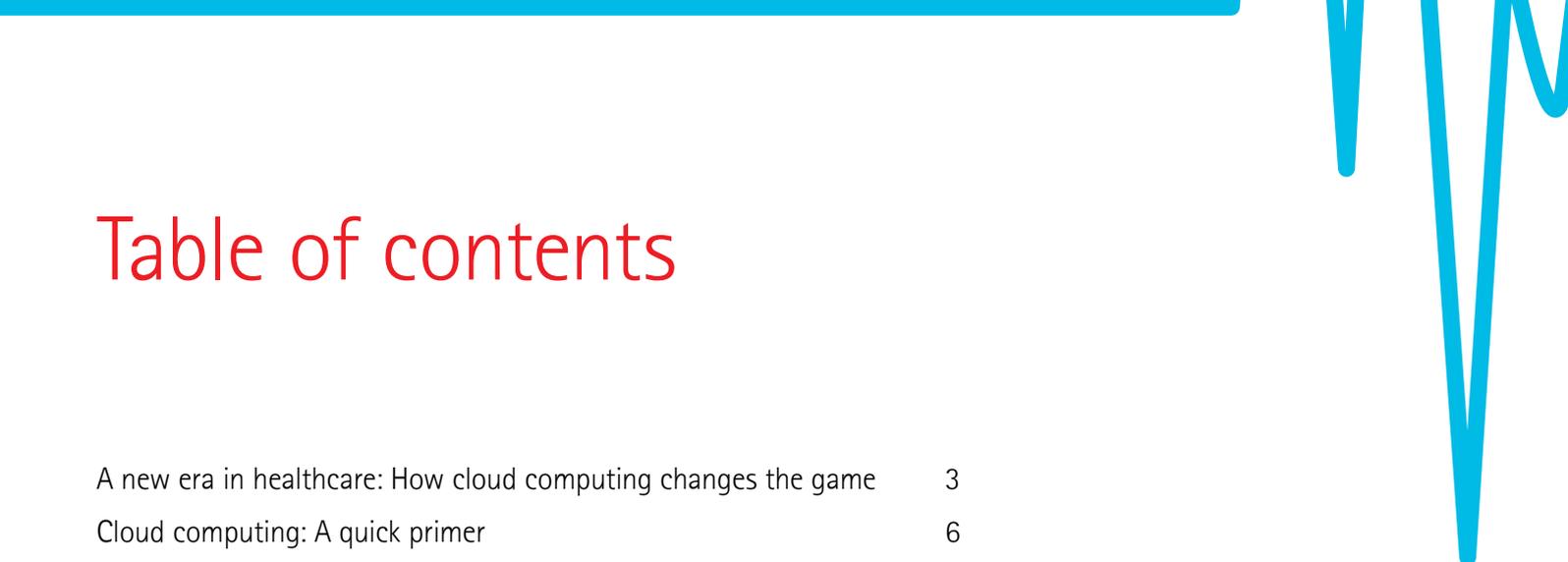


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A new era in healthcare: How cloud computing changes the game

The past year has seen a surge of interest among healthcare companies regarding the potential of cloud computing. Accenture's own experience underlines this: we are currently conducting a significant number of cloud assessments in the industry, with many players set to start moving healthcare-related applications across to cloud platforms in the coming months.

An accelerating migration...

This accelerating migration to cloud computing clearly represents a step-change for the way the healthcare industry sources its information technology (IT). The sector's technology infrastructure and systems have traditionally been highly fragmented across the industry. They have been managed in-house behind strong firewalls, reflecting a combination of piecemeal, bespoke development, and concerns over data security. The healthcare sector is now learning from other industries such as financial services, harnessing the cost and agility benefits of cloud without compromising data security.

...that means healthcare will never be the same again

Beyond driving a shift in healthcare IT, the key question is whether cloud computing will act as a permanent and pervasive game-changer for every other aspect of the health industry—including its operating models, service offerings, collaborative capabilities and, most importantly, end-user services. In Accenture's view, the answer is a definitive "yes", for several powerful reasons.

Why? Essentially because healthcare—in all markets, and in every activity and intervention—is becoming more digital, more collaborative, more patient-centered and more data-driven. The momentum behind each of these dimensions of change is unstoppable. And, going forward, each of them will be very difficult—if not impossible—to achieve without tapping into the power, scalability and pay-per-use cost models of cloud computing.

Early movers demonstrate cloud's potential

The appetite for cloud computing in the healthcare sector is already being demonstrated by rapid and rising uptake of a number of cloud-enabled vertical industry offerings. For example, demand among physicians and practice holders in the U.S. can be seen in the rapid adoption of cloud electronic health record (EHR) services such as Practice Fusion, which uses a 'freemium' model and now has over 150,000 practices using its EHR offering across all 50 U.S. states.¹

At the same time, large international players such as Microsoft, Qualcomm Life, Philips, Verizon and AT&T have launched cloud-based vertical solutions aimed at the healthcare sector. In general, the global trend is that cloud solutions are supporting greater sharing and accessibility of health data—a development also being seen in countries from Singapore to Spain.

Medical imaging is one of the most mature uses of cloud in healthcare. Subscribing to a cloud solution for storing and sharing the huge data files involved in medical imaging can save hospitals, physicians and other organizations in the healthcare value chain heavy up-front investments in high-capacity systems, while also boosting speed and efficiency. Accenture has a multi-year collaboration with AT&T, offering advanced medical imaging capabilities in the cloud to hospitals in the U.S. (See opposite page for more information.)



Cloud will enable healthcare IT to leapfrog other sectors

Going forward, with the rising adoption of cloud solutions, we believe we will see the healthcare sector overtake other industries in its use of technology. In the same way as emerging markets have leapfrogged developed economies in adopting services such as mobile payments, cloud computing presents opportunities for healthcare to overtake other sectors in exploiting the new wave of IT innovation.

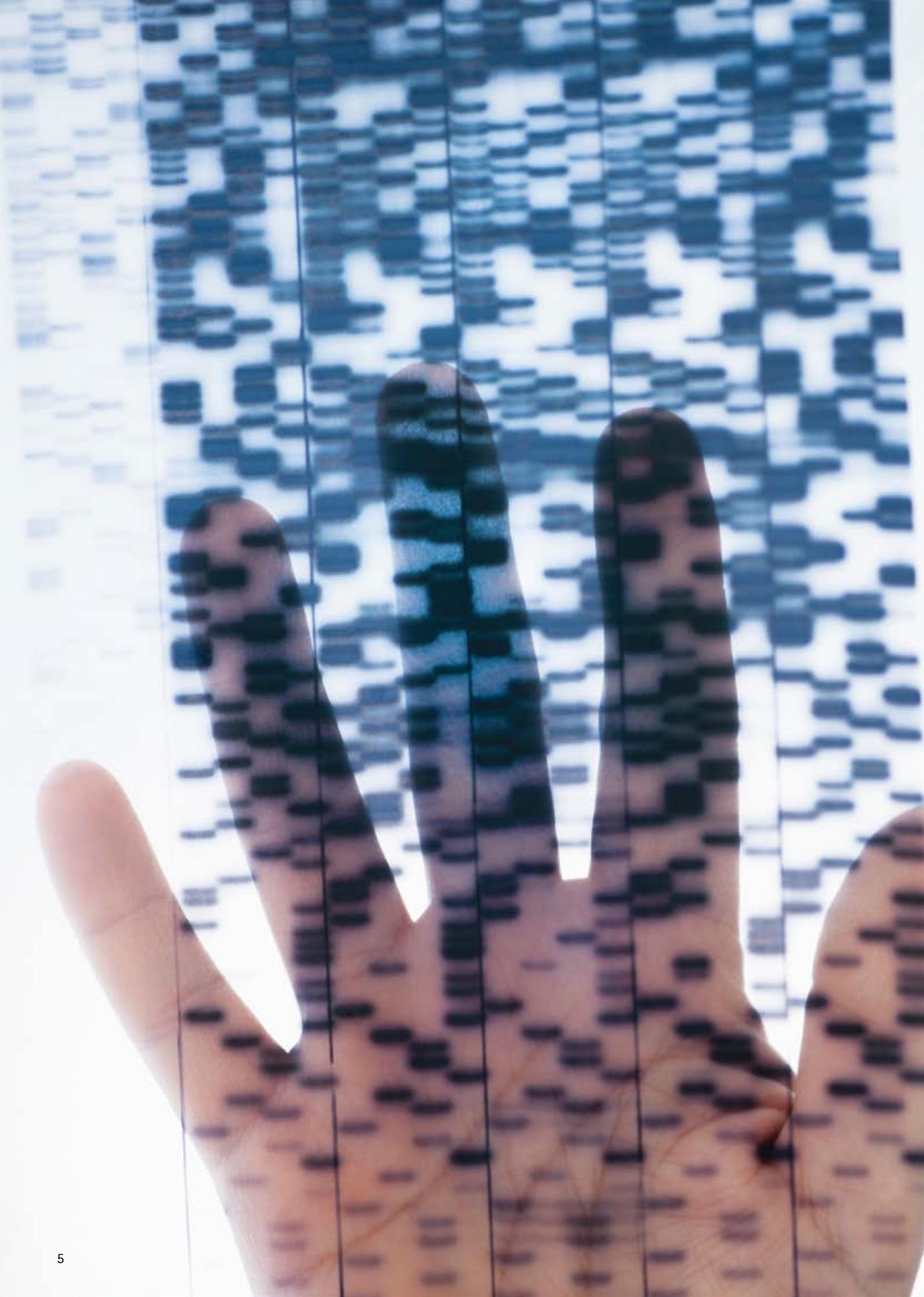
Across the world, much core industry infrastructure in healthcare is either non-existent or has lacked investment, often because it is funded by restricted government budgets. As a result, there's an urgent and pent-up need for technology renewal—and cloud can enable this to happen without a massive up-front spend.

This development is also being encouraged by regulation. In the U.S., for example, there is a drive in federal and state regulations towards health information exchanges (HIEs), which are hubs that interconnect different electronic medical record (EMR) systems to ensure easy access to longitudinal patient data. Cloud platforms are ideal for supporting HIEs.

Given the diverse, fragmented and highly dispersed nature of the healthcare industry and value chain, the effect of cloud computing on healthcare will be magnified by the convergence between cloud, mobility and data analytics. It is through the combination of these three elements that many of the most game-changing impacts will emerge.

Accenture and AT&T Medical Imaging Solution²

The Accenture Medical Imaging Solution, enabled by AT&T, enables health professionals and radiologists to electronically share, review and store medical images, such as X-rays and computed tomography (CT) or magnetic resonance imaging (MRI) scans. The system allows users to review patient images almost instantly, gives radiologists time to see more patients, and improves long-term technology costs and profitability. The solution can also enable national hospital networks to centrally manage medical images and collaborate efficiently with other institutions, physicians and radiologists.



Cloud computing: A quick primer

Cloud computing is a model for providing and sourcing information technology services on a "pay-per-use" basis through web-based tools and applications. Cloud services are elastic—allowing them to be highly configurable, adaptable and scalable—and require less up-front investment and ongoing operating expenditure than traditional IT models.

Clouds generally take one of four forms (or a combination of these forms): private, public, hybrid and community.

Private clouds are dedicated to a single company for private use and can either be built within a company's premises—or located off-site, and owned and provided by an external third party—to deliver virtualized application, infrastructure and communications services for internal business users. They can also offer increased ability to ensure security compliance and help meet data residency needs.

Public clouds are accessible to the public over a network and fully owned and provided by external third parties. They can also offer very high resilience and availability capabilities.

Hybrid clouds blend the benefits of public and private clouds, by enabling a company to retain confidential information in a private cloud while providing access to the wider choice of cloud computing services offered by public clouds. **Community clouds** are collaborative resources shared between a limited number of selected organizations with common interests—perhaps in

the same industry or geographical region—with the costs spread across the users. Community clouds can be hosted internally or by external third parties as a managed service.

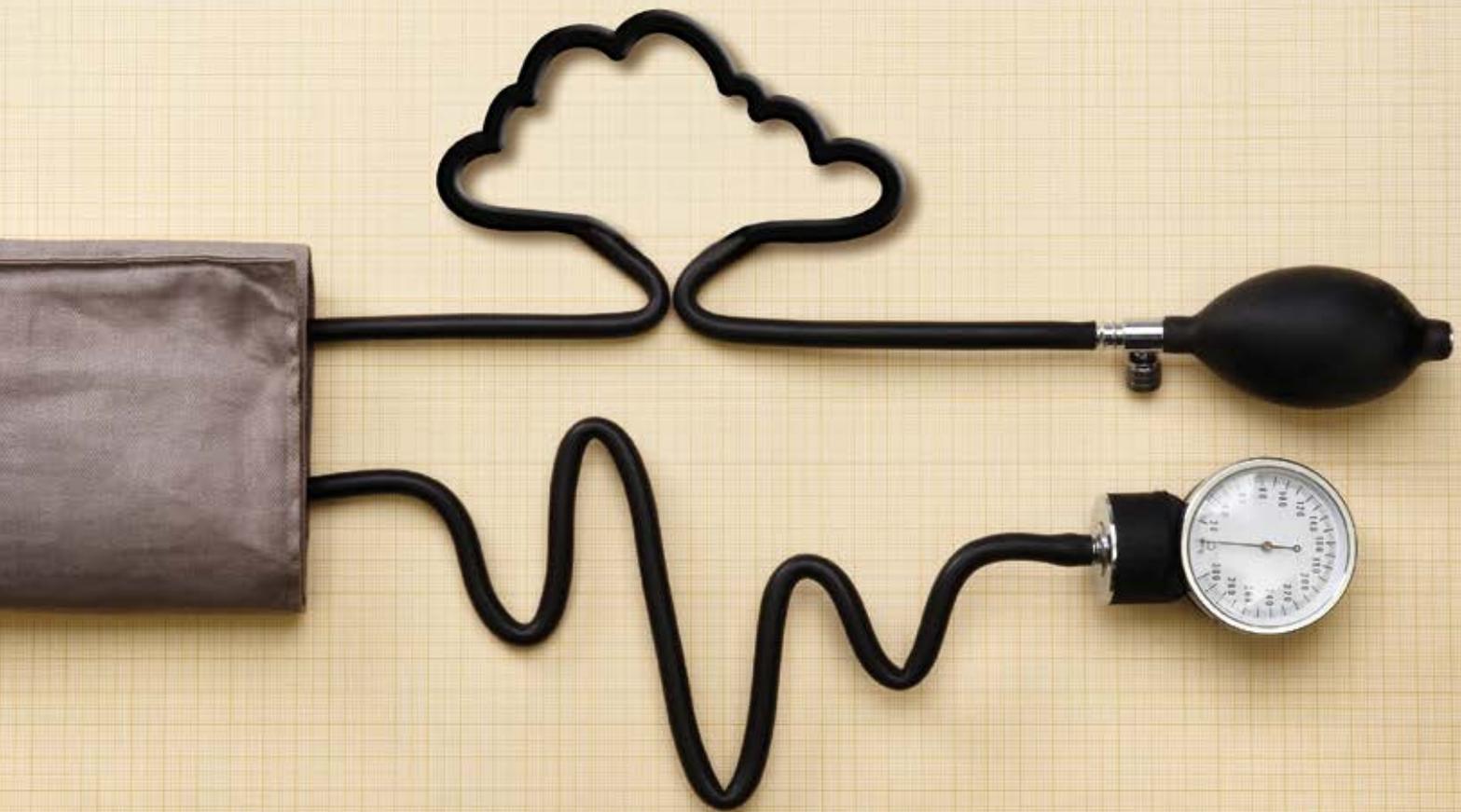
All four forms of cloud computing can provide computing "on demand" at one or more of four levels:

- At the **infrastructure level**, companies use Infrastructure as a Service (IaaS) offerings to source raw computing resources, processing power, network bandwidth and storage on an on-demand basis. IaaS is the most basic cloud service model.
- At the **application level**, generally known as Software as a Service (SaaS), a complete software application is delivered to the end-user, encompassing any application and associated data. This data is centrally hosted in the cloud and accessed via web browsers, supporting device independence and anywhere access. Some business areas—such as customer relationship management companies like Salesforce.com—have achieved widespread uptake of SaaS across many industries.
- At the **platform level**, Platform as a Service (PaaS) is a software platform including infrastructure elements such as database, middleware, messaging, security and development tools, and a presentation layer used to develop custom applications. It provides companies with an environment that supports rapid evolution of the software development lifecycle where there is a need for continuous change.

- At the **business process level**, cloud computing-based solutions—known as Business Process as a Service (BPaaS)—offer a web-enabled, externally provisioned service for managing business processes. These solutions differ from application clouds by providing end-to-end process support, covering not just software but also people processes such as contact centers.

Over time, today's individual forms or "flavors" of cloud computing will evolve into a model known as Everything as a Service or XaaS, in which all infrastructure, services and processes are provided from the cloud.

Five ways cloud computing
—in combination with mobility
and analytics—will change the
game in the healthcare industry



1

Creating the agility for health providers and insurers to flex their business models, collaborate at low cost and high speed, meet changing regulations—and deliver better patient services

Across the world, widening access to healthcare—given added momentum in emerging markets by rising wealth, and in countries such as the U.S. by government health reforms—means companies need greater agility to adapt to change at high speed and low cost. Cloud computing will bring this, enabling healthcare-related businesses to adapt their business models; develop new capabilities quickly and cost-effectively; and connect, collaborate and share information more flexibly along the value chain.

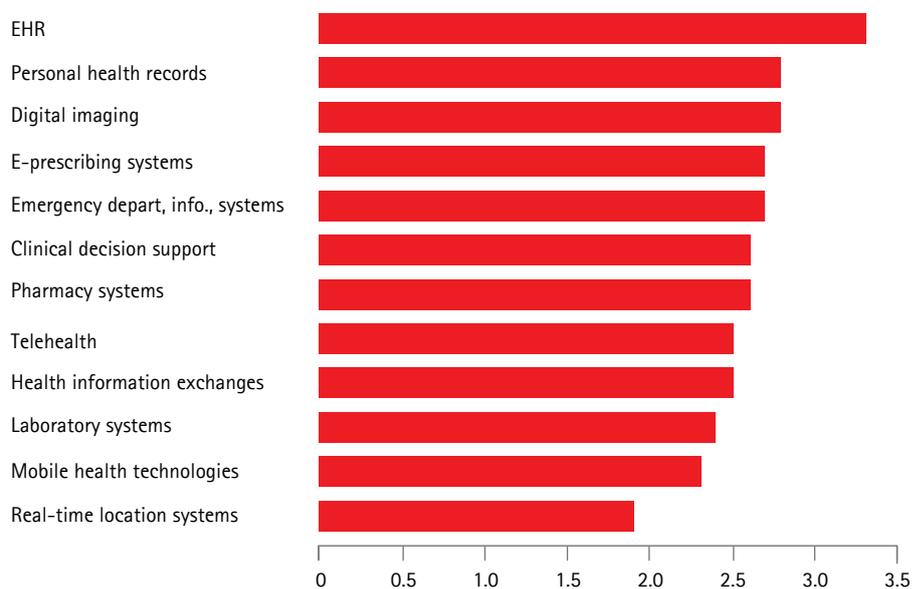
The U.S. exemplifies this need. Insurers used to focus mainly on operating on a business-to-business (B2B) basis, essentially selling to employers so they could provide healthcare services to their employees. But regulatory changes mean they are now moving towards a more individual retail-style business model, which means switching to a business-to-business-to-consumer (B2B2C) or even a direct business-to-consumer (B2C) model.

The resulting need to reach, engage and manage millions of individual end-customers is demanding new, more flexible and more powerful systems; better targeting and personalization; and links to myriad devices. These characteristics all echo other sectors' increasingly cloud-based platforms, such as the customer relationship management (CRM) and sales solutions used by retailers. In turn, these new imperatives play to the strengths of cloud's scalability, analytics and device agnosticism.

At the same time, the flood of patient data needs to be securely shared with healthcare providers. With recent changes to the U.S. Health Insurance Portability and Accountability Act (HIPAA) and Health Information Technology for Economic Clinical Health (HITECH) Act, as well as increased demand for more

Figure 1: Hospitals' IT investment priorities, as ranked by hospital CIOs

Rate the following investment priorities 2011 to 2012 (1 unimportant, 4 critical)



Source: Ovum, 2013 Trends to Watch: Healthcare Technology, Oct. 18, 2012.

control over health data, there is a need for more interaction between the different aspects of healthcare. Providers are engaging in a race to be the provider of choice, and patients are demanding easier access to their information.

As a result, adoption of EHR systems has emerged as the top industry priority—and not just in the U.S. Global independent analyst firm, Ovum, has surveyed 150 hospital Chief Information Officers (CIOs) from six countries in North America and Europe, almost all of whom ranked EHRs as their top investment priority among clinical software solutions for 2013 (see Figure 1). The largest driver for this EHR adoption remains government incentive schemes aimed at the deployment of healthcare IT.

To meet this growing demand, EHR applications and associated technologies such as direct secure messaging are increasingly moving to SaaS delivery models. This move helps extend reach and effectiveness, meets the challenge of managing unprecedented volumes of data, and—in the U.S.—demonstrates "meaningful use". Regulation is pushing the whole industry towards storage, collaboration and sharing in the cloud—using the scalability and processing power of the cloud to provide the necessary processing, storage and analytics, as well as links via mobile devices to reach health professionals in the field, and even patients.

2

Helping ensure seamless, personalized healthcare anywhere in the world, through ubiquitous and secure data sharing

With the move towards EHRs gathering momentum across the world, the cloud opens up the prospect of patients' digitized health information—medical histories, scan images, blood types, allergies—flowing freely across the world, accessible via secure authentication to people authorized by the patient.

Coupled with the ubiquitous uptake of mobile devices and rising adoption of bring-your-own-device (BYOD) working practices across the healthcare industry, the ability to share medical data securely on cloud platforms via any device will have a transformative impact on personal healthcare.

Crucially, access to personal medical data will not be limited to an individual's general practitioner (GP) or local hospital, but can be instantaneous for anyone who needs it—which in an emergency might be a local care center, paramedic, nurse or other professional. A pharmacist would be able to check a person's allergies when issuing a prescription, or a paramedic attending a traffic accident could check an individual's blood type and pre-existing conditions.

At the same time, medical scan images would be shared via cloud platforms in real time with top specialists anywhere in the world, enabling diagnosis and recommendations overnight. Courses of treatment and outcomes could also be monitored anywhere in the same way. If someone travelling overseas fell ill, they could provide local doctors on the ground with direct and immediate access to their health records, and get more appropriate treatment as a result.

Robust data security in the cloud will help enable this vision. While healthcare companies have traditionally been concerned about the security of cloud data, the reality is that data stored in a public cloud can be more secure than data held in-house, because of a reduced surface area exposed to attack, and the ability to apply consistent industry-leading security capabilities across all information (which would be cost prohibitive in enterprise IT environments).

That said, there is a balance between a number of more complex attributes, such as the ability to comply with specific local security regulations using a public cloud's general security capabilities; data export regulations; and unique healthcare security concepts such as "break the glass" and audit of record access, which may not be readily available offerings from standard cloud providers. To begin to address these complexities, cloud providers are actively working to ensure the appropriate levels of protection are available through a maturing set of data security and privacy controls. They know that if the right privacy capabilities are not in place, they will not be successful in the healthcare industry.



Addressing security and compliance requirements related to data privacy, intellectual property protection and compliance regulations

Security concerns such as the risk of unauthorized access or loss of sensitive information (known as protected health information (PHI) to healthcare companies) can be addressed by the right combination of currently available cloud provider security capabilities, and third-party security products and services. This combination can help align clients' regulatory compliance requirements—for example regulations under the Health Insurance Portability and Accountability Act. (HIPAA), Health Information Technology for Economic and Clinical Health Act. (HITECH) and Federal Information Security Management Act (FISMA)—while bolstering consumer confidence in the protection of PHI.

For example, sensitive data can now be made "self-protecting" by having security and authorization access built into the metadata attached to the data itself. This enables the security to flow with the data as it moves across cloud services, networks and devices, ensuring it is only readable by authorized individuals. Cloud-based identity and access management service providers are increasing their penetration through the stack, offering federated identity management, advanced biometric and geo-location authentication, as well as risk-based, adaptive authorization, which means that specific application and process level transactions are not permitted without additional user interrogation.

Cloud computing can also help secure data shared between different parties, enhancing interoperability, collaboration and, ultimately, patient care. Encryption and tokenization of data at rest, in

transit and in process, is a cloud security technology prime for implementation with successful deployments in other highly regulated industries. We have observed an increase in the use of function-preserving data protection (such as tokenization and anonymization) to permit applications' search and reporting capabilities, while keeping the necessary safeguards around patients' PHI.

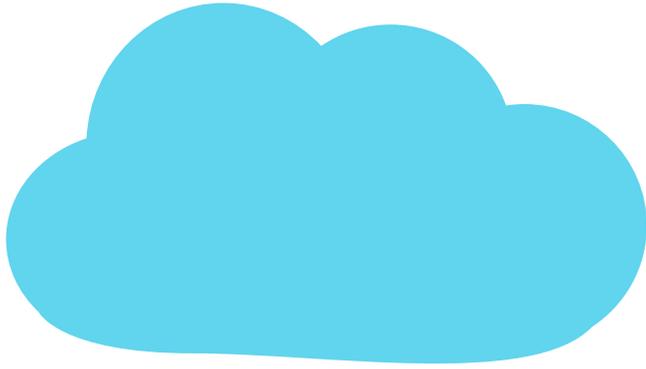
Healthcare involves security concepts that are not a part of other industries. Concepts such as consent, "break the glass", data access history disclosure, and proxy health data custodians bring complexities in authentication, authorization, auditing and disclosure.

In order to efficiently protect sensitive data and provide for special circumstances around health-related security processes, the security lens must be applied not only to internal employees, but also the larger extended health enterprise, including scientists, patients, suppliers, distributors and partners. The other important aspect is to clearly define the security responsibilities between the tenant and the cloud providers; the explicit security services cloud vendors are expected to provide must be included in service contracts. Available security services will vary significantly from one cloud provider to another, and depend on the type of cloud service.

Cloud computing will help healthcare companies manage fresh challenges emerging on the horizon. These challenges include a new generation of security threats, as well as regulatory oversight that will impose greater control over

health data. To overcome these hurdles, healthcare companies will need more potent analytics-based security systems. As such, SaaS is maturing to support new and integrated security capabilities. Today's hyper-connected world demands an orchestrated, in-line means of protecting healthcare data and preventing it from being exposed. Appropriately architected security platforms will allow easier management of large volumes of fast-changing event data. It will also help to suppress insider threats by analyzing data about comparative network usage patterns—to see, for example, whether an employee's time spent downloading patient history reports is out of the ordinary. The platform might compare information packets; the same packets going to different hosts could indicate that information is being echoed to a snooping threat.

Ultimately, Accenture's view is that every individual will have one secured personal credential covering their entire life—financial, employment, driving license, health record—that is held on a cloud platform and accessible via multiple systems, with healthcare professionals authorized to access only the medical information.



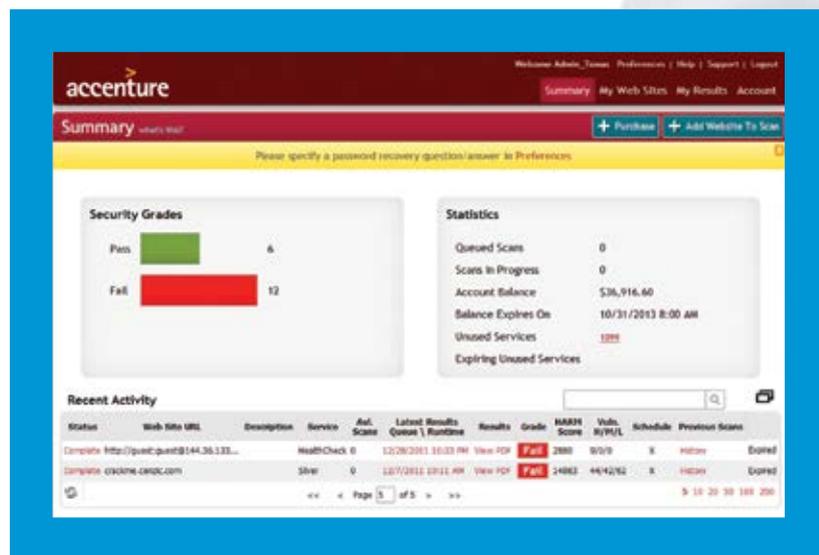
Moving toward the new normal: Security as a Service (SECaaS)

As cloud services mature, more healthcare companies demand security requirements be met by providers and third-party offerings. Many of these third parties are moving to cloud-based offerings to meet these needs.

Services are emerging to cover all cloud models in the context of both private and public clouds, and will support hybrid cloud integration with existing enterprise IT environments. The benefits for healthcare include the ability to deliver security services, at scale, that would otherwise be cost prohibitive to procure, integrate and maintain. Customer confidence and trust in healthcare companies that proactively demonstrate security due diligence will remove barriers to customers adopting healthcare companies' business services.

As an example of SECaaS offered through a cloud broker, Accenture has developed Web Application Scanning as a Service (WASaaS), to help healthcare and other customers quickly and cost-effectively understand the security status of their applications. WASaaS facilitates security assessments of cloud-based web applications, mobile applications and static code analysis, with integration into broader on-site enterprise governance risk and compliance products.

Figure 2: Screenshot of Accenture's Web Application Scanning as a service report output, designed to help healthcare customers understand the security status of their applications





3

Shifting the locus of chronic healthcare from the hospital or clinic to the home—delivering better patient care and comfort at a lower cost

In developed markets such as the United States, it is estimated that around 80 percent of healthcare costs are generated by care for chronic, rather than acute conditions. This is partly because the "site of care" is often a hospital or other care center, with all its related premises and services costs.

In the future, cloud solutions will enable healthcare providers to place remote mobile diagnostic devices in patients' homes, link these to cloud platforms, and monitor them continually with applications, including cloud-based predictive analytics. In combination, these elements will enable patients with chronic conditions to stay in their own homes, while giving providers the ability to track treatments and take action whenever necessary—including anticipating and intervening to address health problems before they arise. Home visits may also be less necessary, as cloud-enabled devices will be able to communicate the results of at-home blood, saliva and other tests, while healthcare providers will monitor the results remotely.

This future is already taking shape. Providers such as Qualcomm Life⁴ are offering cloud-based wireless solutions for chronic disease management and reliable sharing of medical information, supporting health monitoring in the home. Rising adoption of such solutions will reduce the need for healthcare professionals to travel and conduct face-to-face consultations, saving providers, insurers and patients time and money, including administrative and property costs. It will also reduce carbon impacts and costs from health-related transport—in the United Kingdom, it has been estimated that five percent of all road traffic in England is linked to the National Health Service (NHS).⁵

Cloud-based communications platform enables virtual video visits⁶

Minneapolis-based Fairview Health Services has put in place a cloud-based communications platform that enables its physicians to carry out virtual video "visits" with patients, and schedule follow-up video visits. The company, which runs 10 hospitals and 42 clinics, implemented the technology to support voice, chat and video services in the health system's centralized call center. The system is secured using encrypted communications provided by Revation Systems, which supports Fairview Health Services' compliance with the HIPAA.

These video capabilities enable physicians to consult with patients in their homes, and help pharmacists inform patients about their medications, answer their questions, and ensure that different medications do not conflict with each other. Interpreters can also be brought into the video link to help communicate with patients when necessary.



4

Harnessing and analyzing health and non-health "big data" in the cloud—including social media—to improve public health through preventative well-being monitoring and encouraging healthier lifestyles

As well as shifting the main locus of healthcare to the home, cloud computing continues to enable a step-change in overall standards of public health, by enabling preventative interventions and promotion of healthier lifestyles among society as a whole. This will benefit patients and payers by creating a population with less illness and longer lives, and help healthcare providers focus their resources and skills more effectively.

Future integration with cloud-hosted analytics capabilities will provide health professionals with the ability to perform measurement and exploration using aggregated data. Analytics as a Service capabilities can include predictive modeling and profiling analytics across large-scale data sets; taking advantage of state-of-the-art security controls such as strong authentication, encryption and access based on fine-grained authorization; and anonymization of data sets to provide assurance that data is accessed, processed and stored appropriately.

Alongside health-monitoring devices, the home of the future will host a whole array of other connected devices—smartphones, tablets, internet TVs and online scales—that can help to build up a full picture of someone's well-being and lifestyle. Other elements of people's electronic footprint will also include their travel patterns, and activities such as gym memberships and medical visit records.

As long as an individual agrees, this diverse information could be blended with his or her healthcare data to produce a valuable and diverse set of detailed personal data. This wealth of individual information could be subjected to sophisticated predictive analytics to provide advice that helps people live more healthily, and to anticipate health problems before they arise. These

solutions may even advise people on the best restaurants to go to for healthy options and what to choose from the menu, based on their health requirements.

Social media will support improved lifestyles by allowing people to share their data and experiences. It could even enable sponsored competitions, in which individuals' lifestyles are monitored and prizes are awarded to the healthiest participants. Aggregating this data across the population would amass a pool of "big data" that could be analyzed and modeled to provide an evolving picture of general health in society. This data could also support research into different conditions and treatments, highlight changes in public health, and provide early warning to policy makers about emerging challenges such as rising obesity. Social media can support the adoption of patient-oriented health services that consolidate patients' information; healthcare providers can use social media credentials as an initial method of contacting an individual, before more stringently identifying the individual and requesting access to their personal health information.

These types of solutions demand cloud computing, since only cloud offers an affordable way to access the scalability, flexibility and processing capacity needed to capture vast amounts of data from so many sources, and then run powerful analytics on it down to the level of the individual citizen. Developing these capabilities in-house would be prohibitively expensive. In formulating its approach to leveraging cloud data and analytics, the health industry will be able to learn from other consumer-facing industries such as retail and media, which are already personalizing their offerings using a fusion of cloud, mobile and analytics.

Unleashing the power of personal data: Opportunities along the value chain

In Accenture's view, the ability to collect, store and analyze a rich combination of personal health and non-health data will open up further major opportunities for the various participants in the healthcare value chain, while also benefiting individuals. For example, on the payer side, insurers could support the move to healthier lifestyles by offering discounts based on monitoring policyholders' health—such as how much TV they watch or whether they buy healthy foods at the supermarket. Meanwhile, employers could set up an arrangement where they pay less to insure an employee who follows a healthy lifestyle, and then pass on some of the benefit to the individual. In the future, employees could increase their earnings by agreeing to walk to work or visit the gym on the way.

5

Transforming access to health services in emerging markets without heavy investment in physical hospitals and clinical centers

In many emerging markets—and especially in remote rural areas—healthcare infrastructure and services are rudimentary if not non-existent, and people have very little access to qualified health advice and treatment. However, in emerging market, what more and more people do have is a mobile phone, which increasingly means an internet-connected smartphone. By linking these and other smart devices to a cloud platform, emerging markets will be able to bypass the stage of physical infrastructure in health (as some have already done in telecommunications and financial services), and transform people's access to good healthcare.

Just as internet-connected physiological monitoring devices will become commonplace in people's homes in developed countries, so this same equipment could be installed in remote villages to enable services such as blood tests, scans and prenatal monitoring for pregnant mothers. This would enable scarce healthcare resources and skills to be targeted more accurately when and where they are needed.

As a result, we believe doctors will need to travel less and will be able to spend more time advising patients, meaning their skills will be leveraged more effectively and efficiently. Storing people's EHRs in a cloud environment will also mean that when a doctor makes a periodic visit to a village, he or she will be able to view a person's records via a mobile device and gain immediate access to their health records, highlighting any changes since their last check-up.

As in developed markets, aggregating and analyzing the resulting mass of individual health information will enable health authorities and providers to identify patterns in public health and provide early warning of problems such as epidemics or poor diet. As a result, the cloud will provide emerging markets with a long-awaited solution to the challenge of supporting and delivering medical services in areas without the legacy infrastructure of hospitals, clinics and health centers.

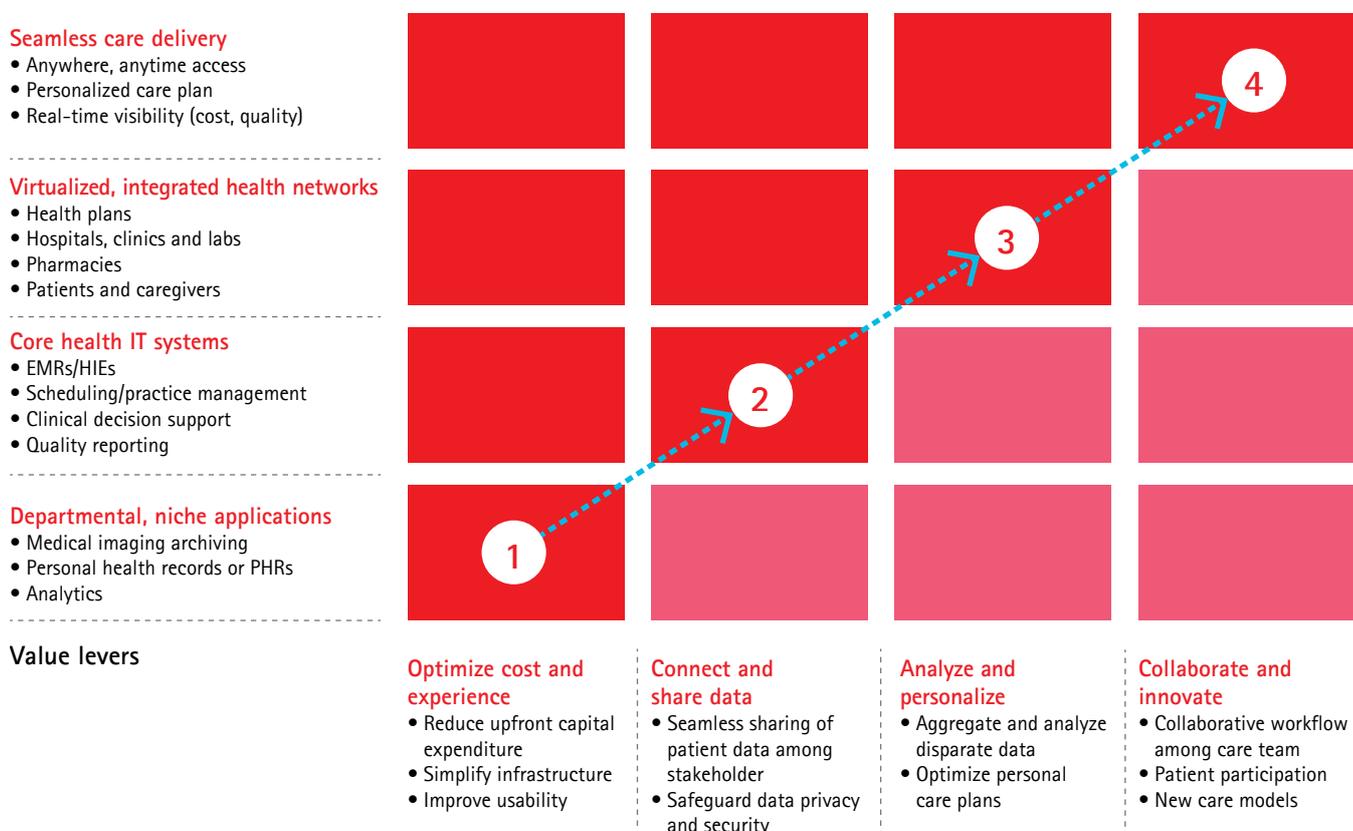




Journey to the cloud: Accenture's roadmap and maturity model for healthcare companies

As healthcare companies usage of cloud grows, they are on a journey toward using cloud's unique attributes as an ever greater source of competitive advantage.

Figure 3: Cloud maturity model for the healthcare industry



Leveraging cloud to achieve lower cost, better outcomes, and more ready access to health care

As healthcare stakeholders' comfort level with cloud increases, they will be on a journey toward a greater use of cloud's unique characteristics (e.g., exo-skeleton) to yield more strategic business benefits. Accenture has created a maturity matrix to help these organizations better orient themselves, identify upcoming opportunities, and plan best next steps.

The matrix divides the cloud journey into four main phases.

Experimentation

Focusing on "low hanging fruits" or quick wins in niche functional areas that lend themselves to cloud advantages, including lower cost, quick time to market.

Foundation building

Laying out basic digital infrastructure (e.g., EMR, HIE) to enable secure data sharing among stakeholders across the care continuum.

Optimization

Applying data insights to optimize clinical workflow and personalize care plans.

Innovation

Enabling new care models based on seamless collaboration among care team members as well as patients.

Preparing for cloud: A hybrid IT future...

Like companies in other industries, most large healthcare providers and insurers will not migrate all of their data, applications and systems to the cloud; some elements will remain within traditional in-house data centers, resulting in the need to manage a hybrid IT environment. This is because some applications may be too expensive to migrate to the cloud, while others may be being "sunsetting" or retired, and therefore not worth the effort.

As a result, the larger payers and providers will move to a mix of traditional infrastructure (possibly virtualized as a private cloud) and public cloud solutions. At the same time, smaller health organizations such as physicians' practices will tap into the cloud via SaaS applications, enabling them and their patients to benefit from the type of game-changing impacts described above.

Similarly, patients will mainly experience cloud computing through these approaches, becoming—for example—end-users of devices such as remote physiological monitoring devices and smartphone apps that help track their health and promote a healthier lifestyle.

...enabled and managed by the "services broker" role

As they navigate their transition to this cloud-enabled future, healthcare organizations of all sizes will need to find new ways to choose, source, provision, manage, integrate and orchestrate various cloud services and in-house systems. Increasingly, needs will be fulfilled by the in-house IT function or an external provider playing the role of "services broker".

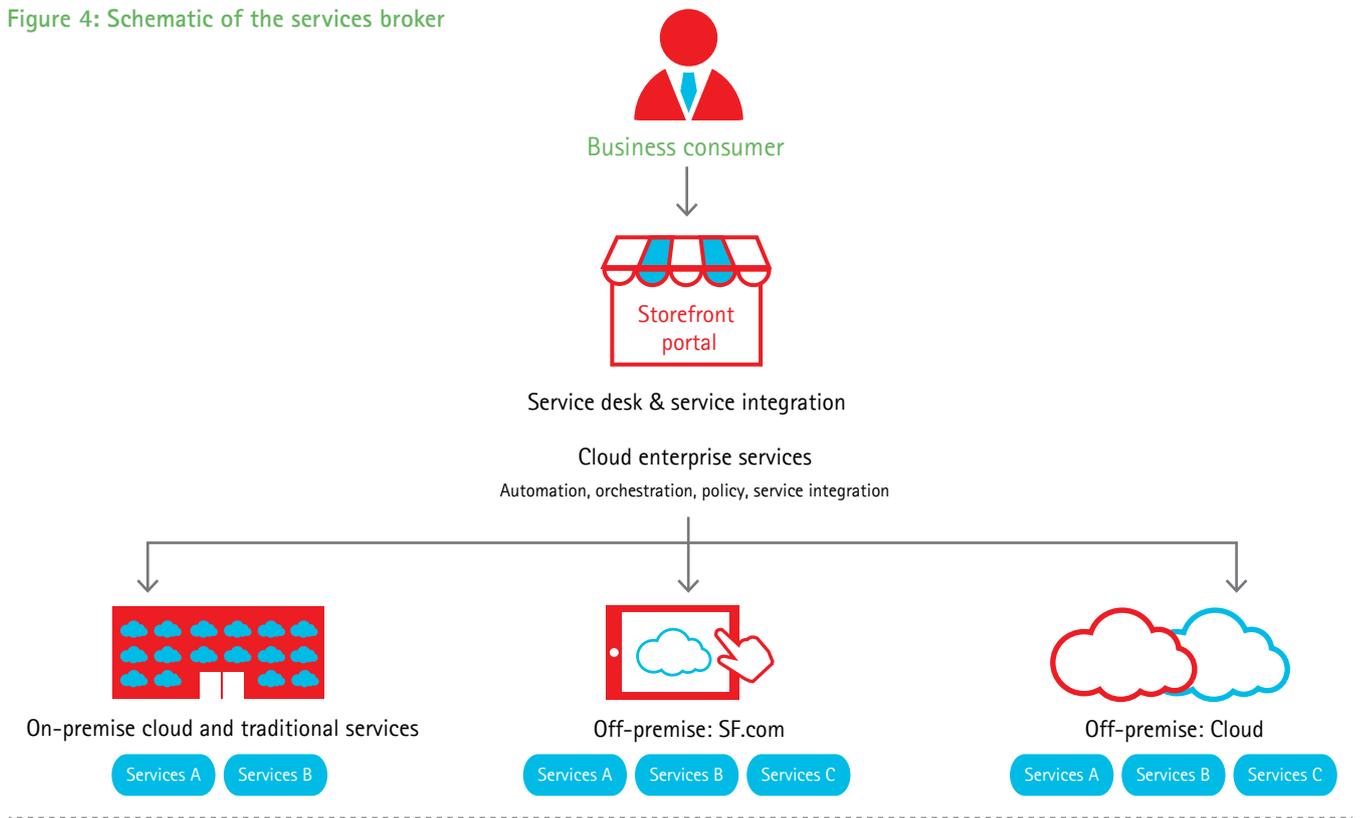
The services broker will meet IT needs across the business by integrating and offering a wide range of cloud services—from IaaS to PaaS and SaaS, and from private to public cloud solutions—in combination with existing, internally provisioned systems. The benefits of this model include the ability to deliver the right solutions to the right users at the right time; stronger and more consistent governance and security; and lower total costs of ownership.

As Figure 4 shows, the services broker—part process, part technology—handles a range of key activities including selecting and negotiating cloud services from cloud service providers; aggregating, automating and integrating services; managing demand, workload and governance; and creating and maintaining a service catalog that cloud consumers can choose and buy from.

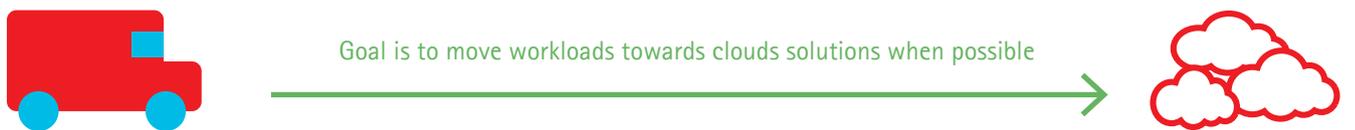
To prepare for the journey to a hybrid, cloud-enabled environment and a services broker model, companies need to look holistically at their entire IT system and seek out ways to simplify it. The more a business can simplify its IT architecture and services, the better placed it will be for the migration to cloud. This may mean virtualizing infrastructure as a first step, and dropping applications that are redundant or seldom used.

In general, rather than just looking to cut costs, experience shows there is value in investing to save money in the future. This includes investing in architecture, tools and governance to fully leverage the benefits of cloud computing, by anticipating the move to a cloud broker model.

Figure 4: Schematic of the services broker

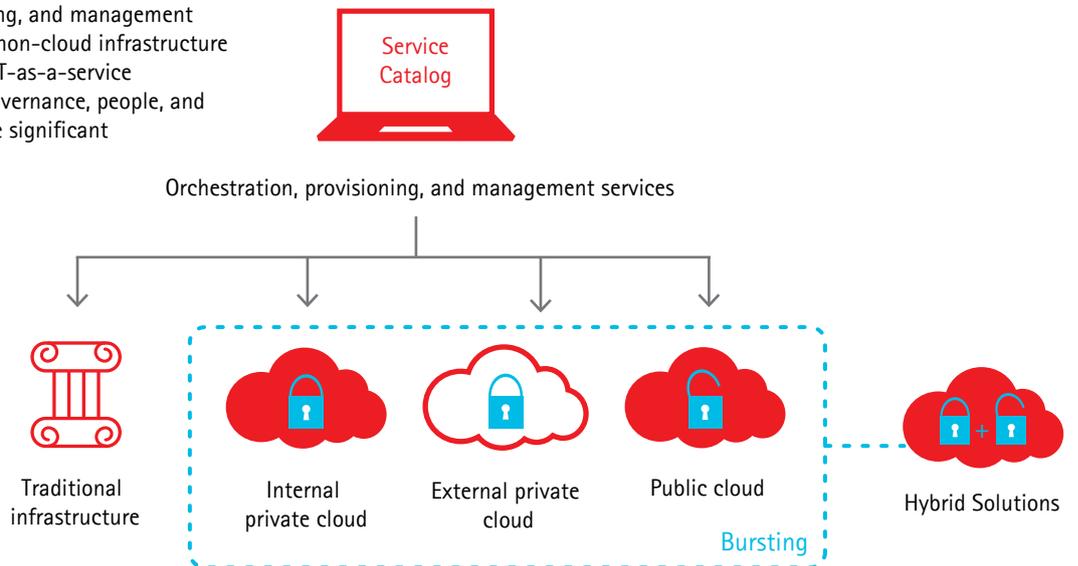


Logical view of infrastructure options



A 'seamless' end-user experience regardless of how a service is provisioned

- Orchestration, provisioning, and management services cover cloud and non-cloud infrastructure
- The trend is towards an IT-as-a-service
- Automation is key but governance, people, and process changes are more significant



No time to lose

As healthcare companies weigh up the potential opportunities and risks around cloud computing, they can be sure that their competitors are now evaluating cloud solutions—and quite possibly adopting them.

Over the next few years, those players that fail to move fast to seize the cloud opportunity will face losing the competitive edge—which will quickly translate into lost customers and market share. Even among those healthcare companies that are aggressively adopting cloud, some do not yet have a clear strategy. But they know they have to start leveraging the technology, and are doing so at pace.

Put simply, the healthcare industry's migration to cloud is inevitable—driven by an irresistible blend of competitive realities and patient demand. And in any step-change in business or technology, early movers tend to reap the lion's share of the benefits.

It is time for healthcare organizations to embrace cloud computing—to ensure that when the game changes, it does so in their favor.





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