



# Your Cloud in Healthcare

INDUSTRY BRIEF WHITE PAPER

The CIO Global Cloud Computing Adoption Study, a recent survey by IDG Research, finds that CIOs are beginning to recognize the strategic implications of the cloud. The majority of IT decision makers among the more than 600 surveyed at enterprise organizations in the United States, Europe, the Middle East, Africa, and the Asia-Pacific regions see “business agility” as the top driver for cloud computing.

## Executive Summary

The healthcare sector is adopting enterprise hybrid cloud across the provider, payer, and life sciences segments with the goal of improving the quality of care, reducing costs, and increasing responsiveness to risk. This industry brief outlines the common hybrid cloud use cases for healthcare organizations and details a real-world example of how cloud computing is being used to achieve greater business agility.

These are challenging times in the healthcare sector. Healthcare organizations must stretch limited budgets to meet increasing product and service demands while complying with new regulations and healthcare reform legislation. At the same time, technology-savvy consumers are now demanding a higher level of interaction—such as instant online access to information, products and services through their desktops and mobile devices. While addressing these challenges, many healthcare organizations are also struggling to manage and optimize their complex IT systems.

Healthcare IT leaders have been responding by modernizing legacy applications and upgrading their infrastructure, but they continue to be strained. Forward-thinking healthcare organizations are deploying cloud computing as a strategy that will eventually transform how the entire organization—not just IT—operates. These organizations are choosing among different cloud-deployment models to meet the unique challenges they face today and to increase their business agility.

## What is Business Agility?

According to McKinsey & Company, the leading global management-consulting firm, business agility is the ability of an organization to adapt rapidly and cost-efficiently to changes in its environment. For the healthcare sector the indicators of agility include active identification of products and services that improve care, greater cost reduction and improved revenue cycle control, and more effective management of risks and reputational threats (see Figure 1).



Figure 1. Agility in Healthcare, Based on McKinsey & Company's Business Agility Framework.

## Quality Healthcare Services Delivery

Healthcare organizations are confronting several challenges in delivering quality healthcare services in the face of forthcoming changes to healthcare regulations and shareholder expectations. Providers seek to improve patient care outcomes while reimbursements for the services provided are uncertain. Payers must provide the transparency demanded by customers at a time of growing market and technology fragmentation. Life Sciences firms want to grow existing revenue streams and deliver new products quickly through shortened clinical trials and efficient use of research data. The industry recognizes that consumers, now accustomed to ubiquitous product information and engaging corporate social networking, are also seeking a matching experience from the healthcare industry. Delivering on consumer expectations, providing the best care, and managing increased governance needs is extremely challenging in this environment.

Agile healthcare organizations are able to identify relevant products and services in a dynamic environment. They can quickly bring quality healthcare products and services to market, improve customer engagement and patient experience within their institutions, enhance existing revenue and rapidly adapt to new policies.

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*“A fundamental transformation in how care products and services are delivered and consumed is underway. Hybrid cloud is facilitating the shift in the healthcare ecosystem to true connected care.”*

— Frank Nydam, Director of Healthcare Solutions, VMware

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## Risk and Reputation Responsiveness

Healthcare organizations must be able to quickly adapt to industry pressures as well as address risks in their environment to maintain their focus on consumer needs and patient care. In the United States, for example, mandates provide both incentives and penalties to motivate organizations to swiftly implement healthcare provisions in the American Recovery and Reinvestment Act (ARRA) and the Electronic Health Record (EHR). Minimizing the risk of breach to patient records and protecting patient privacy has become of major importance to avoid not only heavy fines but also damage to the brand and reputation. Healthcare organizations around the globe must also be able to respond rapidly to the impact of unlikely events such as unforeseen health pandemics or even potentially brand-damaging drug recalls or data breaches.

Agile organizations have a high degree of risk-and-reputation responsiveness. They can anticipate and quickly adapt to new regulations or operating requirements (such as dynamic changes in healthcare regulations, policy and budgets, which can happen as a matter of course). They can also effectively respond to the impact of unexpected or unlikely negative events (for example, a contagious outbreak or epidemic).

## Cost Reduction

Intense cost-management pressures result from the increasing demand for services as budgets shrink across the globe. In the United States in particular, incoming healthcare reform is expected to add an increasing number of newly insured citizens to the healthcare system. This is likely to add to the already high service demand of the aging population. In addition, providers must focus on overhead reduction due to shrinking government reimbursements while preparing for costly and complex EHR systems to avoid stiff

noncompliance penalties. Payers need to continuously increase organizational efficiency while focusing on cost as they try to manage a business amid diminishing and regulated margins. In the Life Sciences segment, companies look to expedite time to market and lower development costs while maintaining quality in the face of tightened access to capital.

Agile organizations have an inherent ability to reduce costs. They continually identify and capture operating improvements in organizational processes, accelerate operational execution of projects, and keep costs in line as services demand grows. Agile organizations do much more with less—an imperative for the healthcare sector in the current environment.

## Healthcare Sector and Hybrid Cloud Computing

Organizations across the healthcare spectrum are looking to cloud computing to increase business agility. Cloud computing provides a dynamic, secure and compliant solution that dramatically reduces IT services-delivery time. Organizations can start with the public, private or hybrid cloud deployment models that help them best meet their specific requirements. However, the greatest benefits and IT cost efficiencies can be attained with a hybrid cloud. Table 1 shows some of the most common hybrid cloud use cases for provider organizations.

PROVIDER CHALLENGE	BUSINESS AGILITY IMPACT
<p><b>Reporting and Mining Clinical Data to Improve Patient Outcomes</b></p> <p>Providers face increasing pressure to both report and mine clinical data to identify ways to improve patient care, comply with federal regulations and manage costs.</p>	<p>On-demand scaling allows providers to provision infrastructure on demand for analytics without upfront capital expenses or significant delays. The cloud solution also allows the provider to realize operating improvement while managing cost with the ability to scale down when necessary.</p>
<p><b>Infrastructure for Patient Care and Claims Data</b></p> <p>Smaller providers often do not have scale to build and efficiently maintain their own infrastructure or technology to mine patient care and claims data.</p>	<p>A multisourced infrastructure allows a shared pool of computing and storage resources to be available to participating hospitals, practices, clinics and labs on a pay-as-you-go basis. This solution enhances revenue and captures operational improvements while reducing cost. Capital is conserved through consolidation, and the infrastructure facilitates revenue realization through improved claims management.</p>
<p><b>Data System Incompatibility</b></p> <p>Providers often have disparate data systems. Rebuilding systems to accommodate the different types of data used in clinical care processes, or to share data with payers, is costly.</p>	<p>A multisourced services solution enables providers to bring together different types of data without a large upfront investment and provides the ability to share information with payers or collaborating practices, and to implement analytical tools. Cloud computing reduces the capital cost of IT infrastructure while improving operational processes with payers.</p>
<p><b>Storage and Management of High Volume of Images</b></p> <p>The explosive growth of digital image usage requires hospitals to invest in infrastructure to store, manage, and share radiology and other images.</p>	<p>Infrastructure and Platform as a Service (IaaS/PaaS) enables cloud-based storage and image sharing. In addition, cloud computing manages and facilitates efficient and secure sharing with radiology specialists and affiliated practices or hospitals. This solution not only reduces the need for in-house capacity and related costs but also improves the operational efficiency.</p>

**Table 1.** Hybrid Cloud Use Case Examples for Providers

Healthcare distributors are an integral part of the healthcare ecosystem as suppliers of the products and services that enable the providers' care. Although they are diverse businesses, they share many of the same business goals as providers, such as creating a valued brand and providing quality products and services in a challenging environment.

### **Case One: Fortune 500 Healthcare Company Leverages Cloud to Grow Revenue, Hone Competitive Edge in Fast-Changing Industry**

The healthcare products industry is fiercely competitive, with companies jockeying to develop and deliver the right products, at the right prices, while providing superior service. Leading organizations are also looking to keep costs in line and manage tight margins while navigating this highly regulated industry, which is subject to extensive and frequently changing laws pertaining to products, distribution, manufacturing and marketing.

A Fortune 500 healthcare organization faced all these challenges, while also looking to expand into new high-growth markets through mergers and acquisitions. The organization had these business goals:

- Drive more revenue volume and profitability across the healthcare value chain by enhancing products and services.
- Reduce time to market for new initiatives such as customer-facing online order management solutions and electronic data interchange systems.
- Offer a consistent customer experience across product brands.
- Efficiently integrate new acquisitions.
- More effectively manage tight margins and minimize expenses in noncore businesses.
- Comply with extensive and frequently changing laws and regulations.

### **Reduced Time to Market and Consistency Lay Foundation for Revenue Growth**

In this same time period, a wave of new acquisitions increased IT demands caused by additional users and inconsistent customer interfaces across a myriad of new brands. To efficiently integrate the new acquisitions, cloud computing provided the scalable capacity that would quickly service fresh demand as well as support existing IT users. To help deliver a uniform “look and feel” that would enable the company to better engage with customers, cloud computing provided standard reusable application components. This drove consistency while also speeding development. Instead of interacting with several different online environments on a daily basis, end users gained a streamlined, standardized experience that minimizes training requirements while boosting individual productivity.

### **Cost Reductions and Risk Responsiveness Among Cloud Benefits**

The move to cloud computing offered additional business agility benefits. The company was looking to optimize key processes to support good business practices and reduce costs. For example, the company recognized that monitoring and accounting for IT usage could lead to accurate chargeback to business units according to actual use instead of standardizing on a 60/40 split. Cloud computing enabled metering and granular reporting on IT resource usage and costs, producing financial transparency and allowing for more accurate and efficient demand management and capacity planning. The cloud’s infrastructure pooling and dynamic allocation also helped reduce the cost and overhead required by “spiky” applications (for example, the 70 percent of the daily Web portal transaction volume that occurred within a 5-hour period). Through automated provisioning and rapid test-and-development environment deployments, cloud computing also enabled the quick delivery of regulation-driven enhancements so the company could stay on top of the many changes in healthcare industry legislation.

This forward-thinking company has a far-reaching vision of cloud computing that includes Infrastructure-as-a-Service (IaaS) and Platform-as-a-Service (PaaS). The IT leader with responsibility for the larger cloud initiative comments that “being 70 percent virtualized, we can quickly adopt private cloud to manage all of our critical production applications. We’re looking to IaaS and PaaS to reduce our time to market and deliver new IT capabilities.”

This move will help the company with its three-to-five-year transformational goals of adding automated management and workload mobility to its cloud. With additional business agility benefits to come as the company progresses further down its cloud-computing roadmap, this healthcare leader is positioned to continue to strengthen its competitive position in a turbulent market.

Payers also benefit from the business agility that cloud computing delivers. Table 2 shows examples of the most common hybrid cloud use cases for payers.

PAYER CHALLENGE	BUSINESS AGILITY IMPACT
<p><b>Data System Incompatibility</b></p> <p>Payers often have disparate data systems across different states. Gathering enrollment, claims and administration, or authorization data across the parallel systems the payer operates can be challenging and incurs parallel costs. Rebuilding systems to accommodate the different types of data used is also expensive.</p>	<p>A multisourced services solution enables payers to bring together different types of data without a large upfront investment and provides the ability to share information and implement analytical tools. Both cost reduction and operational improvements are addressed by cloud computing. Costs are lowered with the reduction of parallel systems while simplifying processes for data gathering.</p>
<p><b>Increasing High-Performance Computing (HPC) Capacity Needs</b></p> <p>As healthcare demand grows, the payer’s computing resource requirements also expand. Building infrastructure to accommodate workloads requires significant investments in HPC capacity that would have low utilization most of the time.</p>	<p>On-demand scaling allows the segmenting of workloads based on types of requirements—for example, CPU, storage, demand profile. This allows payers to shift more “mundane” workloads to the cloud to free internal HPC capacity for short-term, high-priority workloads with very high storage or CPU needs. As a result, internal HPC infrastructure can be built to accommodate lower and more stable demand levels with public cloud resources leveraged during demand spikes. The solution can reduce operating costs while improving capacity in the face of increased demand.</p>

**Table 2.** Hybrid Cloud Use Case Examples for Payers

Life sciences organizations also benefit from the business agility that cloud computing delivers. Table 3 shows examples of the most common hybrid cloud use cases for pharmaceutical and biotech.

LIFE SCIENCES CHALLENGE	BUSINESS AGILITY IMPACT
<p><b>Processing Very Large Data Sets</b></p> <p>Pharmaceutical and biotech R&amp;D involves massive data sets, such as genomic data, which can require significant processing before high value-add analysis can be started on data subsets.</p>	<p>A multisourced infrastructure provides an option to set up a large number of computing nodes for fast parallel processing of data before it is moved back in-house for further analysis. The cloud-computing solution realizes efficient operations, shorter time to market and cost reduction. Large pharmaceutical firms value the speed of provisioning that lessens development time while small firms save costs on internal resources and are able to implement pay-as-you-go.</p>
<p><b>Fast and Efficient Drug Trial Analysis Requirements</b></p> <p>Because drug-trial design requires analysis of large sets of clinical data and complex simulation modeling, fast provisioning of computing resources is necessary.</p>	<p>A multisourced infrastructure can also address drug trial analysis. Using this solution, the company can quickly scale costs with increased demand. Researchers can scale up and scale down necessary computing resources with more flexibility and speed and with lower startup costs than private infrastructure.</p>
<p><b>Efficient Data Sharing and Management</b></p> <p>Genomic or drug modeling data sets grow quickly and are expensive to store or share between researchers. It is often “easier to redo the model than find data from previous experiments.”</p>	<p>A multisourced services solution enables consolidation and simple sharing of genome or drug modeling data within individual companies or among multifirm projects. This solution streamlines research, reduces redundant systems, and lowers the costs of sharing and organizing genomic and drug research data.</p>
<p><b>High CPU Processing Power Needs</b></p> <p>Some research models have high CPU needs and an uneven demand profile—for example, genome sequencing and protein modeling. These models often require fast iterations such as nightly updates. Analysis and productivity is slow among smaller organizations with limited resources.</p>	<p>The on-demand scalability of cloud computing meets R&amp;D computing needs. Scalability of cloud resources compacts research analysis into a shorter period of time, decreases downtime and increases efficiency across the organization. The substitution of capital expenses with operating expenses is particularly important for smaller R&amp;D organizations.</p>
<p><b>Increasing HPC Capacity Needs</b></p> <p>R&amp;D work frequently has spikes in demand and capacity for computing resources; some critical workloads have dramatic demand spikes for relatively short periods of time and require very large data sets. Building infrastructure to accommodate all R&amp;D workloads would require significant investments in HPC capacity that would have low utilization most of the time.</p>	<p>On-demand scaling allows the segmenting of workloads according to types of requirements—for example, CPU, storage, demand profile. This allows shifting of more “mundane” workloads to the cloud to free internal HPC capacity for short-term, high-priority workloads with very high storage or CPU needs. As a result, internal HPC infrastructure can be built to accommodate lower and more stable demand levels with public cloud resources leveraged during demand spikes. The cloud solution can speed development and execution of R&amp;D projects while reducing cost. Capital requirements for HPC infrastructure and operating costs are reduced while capacity is increased.</p>
<p><b>High Resource Requirements for Clinical Trials</b></p> <p>Large pharmaceutical companies invest significant resources in setting up and running infrastructure to manage clinical-trial data. This infrastructure is used for data capture, patient data entry and monitoring, and tracking multiple sites.</p>	<p>IaaS/PaaS enables enterprise applications. Clinical-trial data infrastructure is a significant investment and overhead for pharmaceutical companies and does not provide significant value-add or differentiation; significant time is often required to make any adjustments or changes. A cloud solution reduces IT complexity, setup and maintenance costs while streamlining clinical-trial data management.</p>

Table 3. Hybrid Cloud Use Case Examples for Life Sciences

## Why VMware for Your Cloud

VMware cloud solutions enable healthcare organizations to transform the cost, quality and delivery of patient care products and services. Healthcare IT departments are reshaped into nimble and efficient entities that can respond faster to the needs of researchers, providers, payers and consumers while reducing infrastructure and operating costs. If your organization is thinking about building for the cloud, why not build for your cloud? Although true cloud computing is a standardized approach, the way each individual organization approaches cloud computing is not. VMware is here to help you move beyond the limitations of a one-cloud-fits-all approach.

The way you approach cloud computing will depend on your objectives. Do you want to begin with an internal private cloud? Do you want to leverage public cloud services? Do you want a combination?

In other words, it is not about the cloud, it is about *your cloud*. VMware's unrivaled experience, large customer base and partner ecosystem can help you move beyond current IT limitations to **your** cloud—where you can accelerate IT which, in turn, accelerates meaningful results for your organization.

Your Cloud.

Accelerate Healthcare IT . . . Accelerate Connected Care

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