



Cloud Computing:
Less about the
name, more about
the service

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Cloud Computing: Less about the name, more about the service

Executive Summary

Given the level of confusion and hype over “cloud computing,” it is easy to see why executives roll their eyes and clench their teeth when the topic comes up. This paper is meant to help clear up the haze around the name and explore the strengths behind the service that can bring scalability, automation, and agility to healthcare.

Economic and regulatory pressures have created a critical juncture in healthcare, where providers need to be flexible and nimble to survive. Cloud computing is poised as the technology platform to support several key computing needs.

In a cloud computing scenario, the Electronic Health Record (EHR) or Clinical Information System (CIS) software and information are located in a scalable and elastic environment that is highly flexible, offered as a service, is economical to consume, quick to implement, and delivered via browser. Patient information and data can be accessed anywhere. When combined with a cloud based HIE, data can be shared by a group of hospitals, rather than each hospital having a separate IT infrastructure. This approach enables painless adoption of an environment that is fully compliant with “meaningful use” of EHRs as required by the ARRA stimulus package.

Cloud computing helps hospitals achieve more efficient use of hardware and software investments because it eliminates all provisioning, scales up and down quickly, and is more economical. When provided as a service, cloud computing allows an organization to focus on their business instead of running ever more complex IT infrastructure solutions. When we consider the 10-year life of an EHR or that a CIS goes through 2-3 major upgrades after a typically lengthy and expensive initial implementation, the benefits are compelling.

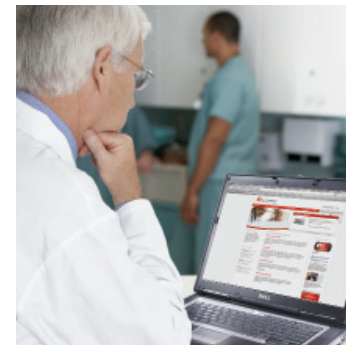
A number of industries such as banking, financial services, and communications have proven that cloud computing is beneficial to their industry and is a secure and reliable computing model. How quickly healthcare will move in this direction seems likely to be driven by the same forces that drove credit card transactions and e-commerce to automate many years ago.

Adoption of service-based offerings in healthcare would seem to be a tremendous asset when you consider elimination of provisioning alone. In terms of effort and calendar time, purchase to productive use should be targeted as automatic and instantaneous. This is a benchmark that is satisfied every day by hundreds of thousands of vendors who sell software, services, and everything else on the Internet.

In the case of software providers, however, “use” may begin with configuration. Most service providers quickly recognize that their ability to begin generating revenue hinges on users transacting business after configuration. This means configuration time eats away at margins and degrades the value of the service itself. With service-based offerings, configuration issues are eliminated through the use of preconfigured templates and self-service configuration facilities. SAP could be considered the most successful example of a highly complex solution being delivered in a self-service configuration mode for SaaS. Amazon may be the best example of preconfigured or automated provisioning with its IaaS offerings.

With respect to choosing a vendor to provide cloud services, your choice should focus on functionality, history in the industry group, basic financial stability, long-term track record of delivering successful products and services in technology, and potentially most importantly, the culture and philosophy of the company as it works with its customers.

While services are generally easier to start and deliver, they can be harder to move away from as a rule. What you need to focus on is acquiring services that deliver speed to productivity, cost benefits, feature/function mix, value-add, stability, adaptability, and other attributes that should push the net total value above that of a traditional implementation.



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If you choose wisely, the benefits of cloud service offerings allow you to focus on the core competency of your business, rather than addressing the vagaries of IT service delivery. That said, if you weigh the risk and reward of a service and decide it's safer to go outside your core competency and "build it yourself," be sure that what your team builds can:

1. Weather the degree of technology, functional, and business change that solutions must endure over long periods of time, well in excess of the capitalization period for the solution. When the solution is fully depreciated, there's not necessarily money to invest in a "do over."
2. Adapt quickly to computing strategy and services that connect your business to the outside world. These are uncontrollable, but fundamental to business survival.
3. Provide the same or better levels of functional value as a provider's service offering over long periods of time while addressing uncontrollable factors, such as employee turnover, changes in leadership, and financial hardship.
4. Make sure it is successfully funded, implemented, supported, and properly maintained outside the pressures and internal hurdles that face corporations.

Overall, the cloud computing value proposition comes down to a reduction of Total Cost of Ownership (TCO) due to shifting costs from fixed-to-variable, improvement of business agility, and greater ability to build systems of a global class with global capabilities.

Cloud Computing: What is it?

In the history of computing, there have been few terms that have stoked such interest, yet generated less congruent agreement among experts as to meaning and benefits than the cloud computing (cloud) phenomenon. Experts struggle to define cloud precisely and many disagree passionately about whether the term "cloud" should even remain in the technology vernacular largely because of the disagreement about what it actually encompasses. As a result, many have difficulty clearly articulating the value of cloud computing and its place in the market.

Possibly the most ironic conclusion from this debate is that none of it really matters. Whether you call it cloud--or puffery for that matter--the premise of utility, Internet-based computing capability will have nearly every leading chief executive, chief information officer, chief technology officer, and financial officer evaluating how this emerging service can benefit their organization and bottom line. In fact, many organizations are already evaluating an investment in technologies that are effectively cloud computing. But make no mistake, cloud computing is here to stay and we believe it represents a critical component in the future of computing power for businesses and organizations.

Common Definitions of Cloud Computing

Rather than getting mired in the definition process, we offer a few representative definitions that will help serve as a backdrop for a basic framework of the cloud computing environment.

Source	Definition
Wikipedia	A style of computing in which dynamically scalable and often virtualized resources are provided as a service over the Internet.
Encyclopedia Britannica	A method of running application software and storing related data in central computer systems and providing customers or other users access to them through the Internet.

Cloud Computing: Less about the name, more about the service

The information technology research and business advisory firm Gartner Group provides a more discrete framework for its overview of cloud computing:

- It is service-based;
- It is scalable and elastic;
- It uses shared infrastructure to build economies of scale;
- It is metered with users paying by use; and
- It uses Internet technologies.

Another leading IT research and business firm, IDC, separates its definitions of cloud into two distinct categories:

Cloud services – Consumer and business products, services, and solutions that are delivered and consumed in real-time over the Internet.

Cloud computing – an emerging IT development, deployment, and delivery model, enabling real-time delivery of products, services, and solutions over the Internet (i.e., enabling cloud services).

While there are endless definitions, related terms (including virtualization), clarifications and other resources that can provide further context to the cloud debate and cloud computing as a service, we choose to rely on the salient points raised within Gartner's five point framework. This structure helps provide a more discrete understanding of cloud, its functionality, benefits, unique financial model, and future impacts on technology implementation and utilization.

Service Based

Simply stated: what you receive from cloud computing is a service. This fundamentally means that what underlies a given service is managed wholly by the provider with limits on options that might include no options at all -- think Google's Gmail service. Great service, but few service upgrades or flexibility for users.

This introduces a concept with broadly ubiquitous use in the "as a Service" mentality typically abbreviated as XaaS where the X represents anything and everything someone can develop and offer to a customer "... as a Service." The generally accepted examples however are important to understand and include:

Infrastructure as a Service (IaaS): This classification represents nothing more than virtualized servers, storage, network, firewalls and other items typically considered infrastructure components in the physical world.

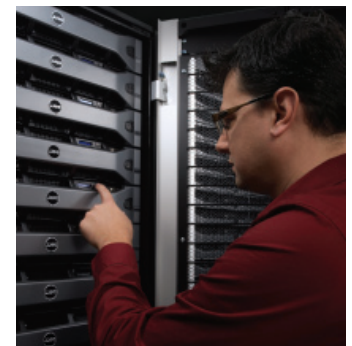
Platform as a Service (PaaS): Infrastructure components crafted into pre-configured kits that typically include software required within the platform itself. Again, this relates directly to the components serving the same purpose in the physical world. Platforms are typically managed by the consumer of the service as a component of their broader enterprise computing strategy.

Software as a Service (SaaS): The heart and soul of providing cloud based software solutions where consumers receive a "seat" or a login with access to the software capabilities granted by the provider. If you have Google's Gmail, use Facebook, or perform online banking, you are an SaaS customer.

Scalable and Elastic

Cloud computing offers the unique benefit that it is fully scalable and can grow and shrink on demand. While elasticity is not a fundamental tenet of abbreviated definitions for cloud, all experts agree elasticity is a key element that must be understood when considering cloud over traditional hardware acquisitions. This attribute represents both the benefits and challenges involved in providing cloud computing services, even for the likes of Google and Amazon.

Fundamentally, a provider's ability to provide scalable and elastic computing services ensures the survival of the service itself. Users who scale their services down create idle investments and potential financial strain for a cloud. Conversely, when end users scale up, if not managed and absorbed systematically, disaster can strike for even the largest computing solutions.



Cloud Computing: Less about the name, more about the service

In the global industry of cloud computing, even the largest have trouble managing the edges of elasticity when design is not thoughtful. Amazon and Google, arguably two of the behemoths in this space, have suffered crippling outages due to their failure to design for adequately absorbing peaks in computing demand.

Shared Infrastructure to Build Economies of Scale

There is no magic in sharing infrastructure to dilute expense, which translates into a pure reduction of unit cost based on leveraging volume, services, and delivery capabilities across large populations.

Recognizing and understanding the “true” total cost of ownership for a given product or service is where many businesses and organizations fail to see the forest through the trees. Do not gloss over the complexity of this analysis. A service cannot inherently be consumed as a traditional IT investment with high capital initial outlay and relatively lower expenses for maintenance. Services are simply not assets. As a result, many businesses find difficulty in comparing their current costs, which reflect assets to be depreciated, with a pay-by-the-use pricing structure. However, financial teams must also consider the total cost of ownership beyond the depreciation schedule. The useful life of a solution is rarely as short as its depreciation period. Businesses must also consider the limitations that traditional or hosted IT infrastructure solutions present in their valuation.

At its heart, cloud computing is a combination of infrastructure and software, which satisfies the five key tenets of the definitional framework provided by Gartner. Therefore by extension, virtualization is a key component and benefit of cloud computing. Traditional hosting—by its very nature—has limited capacity, straining individual implementations with capacity mismatch and therefore does not provide efficiencies in scalability, elasticity, or economies of scale.

Another key consideration is integration. How does the solution you are considering integrate into the balance of your enterprise? Many organizations assume integration can only be achieved by having a solution built within the enterprise. Consider that nearly 100 percent of global commerce is conducted among loosely coupled solutions over the Internet. These transactions routinely move markets in milliseconds. This and other examples test and break down the premise that tight integration can only happen within a company infrastructure.

In reviewing the economies of scale attribute, we offer three salient points to consider:

1. Leaders must dive deeper into the TCO analysis in order to fully understand the value proposition and total cost of ownership beyond a depreciation schedule.
2. Leaders must consider and evaluate how their computing solution will impact their enterprise in terms of feature set, availability, stability, mobility, ability to generate high customer service and high customer satisfaction levels over the long term.
3. Leaders should develop a realistic and meaningful assessment of how a service or product integrates into their business and technology enterprise.

Metered with Users Paying by the Use

Enabling organizations to “pay by the use” is a new world when it comes to financing for the IT environment. This attribute challenges traditional thinking about IT spending and should prompt senior decision-makers to evaluate this emergence in all business sectors.

Traditionally, the value and financial justification of an IT proposal is measured against its life in terms of asset depreciation. That methodology has become engrained in the mindset of chief financial officers (CFO). It will take leadership and vision to break away from that model and consider the life of a solution as more than a depreciation schedule.

However, many CFOs who have been around the block a few times remember a day when an investment in IT was based on the life of the business need delivered by the solution—without regard to its accounting life. If you consider that the cost of satisfying a business need must logically include the cost of changing that solution well beyond its accounting life, the net result can and will often drive a different investment decision.



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Without discounting the importance of accounting treatment and time value of money, the cost and impact of technology is driven by four considerations:

1. The initial investment cost of an IT solution is intensive, regardless of accounting treatment. It may be easier to get capital up-front by presenting a simpler perspective, but even with the value of depreciation and the time value of money itself, pay by use is almost sure to prove cost beneficial over time.
2. Your solution must have the capability to absorb peaks and valleys in computing consumption. Designing around this premise impacts risk to performance, service levels, and ultimately, customer satisfaction. In addition, building to support peak load translates into wasted capacity at some point and risk of down time. The more volatile those peaks and valleys over time, the more pay by the use may better mitigate business and financial risk.
3. Beyond elasticity, every solution contains risk in terms of managing capacity, flexibility, and obsolescence of features and/or the underlying technology. Service providers whose core business is delivery of a service are better prepared and positioned to predict and proactively manage this risk.
4. Eventually your business will change or someone will invent a better mouse trap. Most organizations face a complete solution replacement every 10 years. By leveraging solution domain expertise and economies of scale to deliver its solutions to large populations, service providers are best equipped to smooth out the eventual impact of significant market disruptions or an outright change from solution A to solution B.

In the final analysis, IT controllers and corporate "C suite" leaders are not used to buying compute resources "as a service" under the expense category. However, the net cost to the corporation should be on par or beneficial when considering all factors over the time frame in which the business will require the capability being considered.

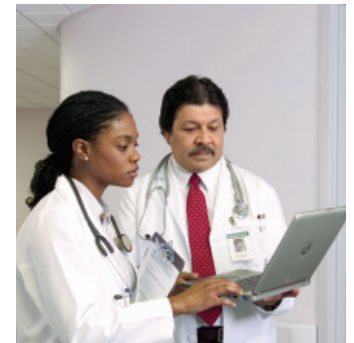
Buying computing solutions in a pay as you go model is not appreciably different than paying your electric bill or buying food to consume. Just as with electricity and groceries, when the supply chain for a service is more efficient at producing the service at a price point which is more beneficial than producing your own, it is probably time to treat that requirement as a utility.

Thus, the birth of the "utility computing" concept that has since morphed into the more comprehensive and usable cloud services model.

Using Internet Technologies for Delivery

Definitions become a little grayer as we look in more detail at the delivery model for cloud. While some seem to flutter between Internet delivery specifically or try to soften the blow by "using Internet technologies," we suggest the answer is really via browser. By focusing on delivering via a browser, the three leading concepts for cloud computing remain meaningful applications for an enterprise:

Public cloud: From a presentation layer perspective, a public cloud is simply a browser-based service delivered via the Internet using an IP-based protocol. HTTPS at its simplest form is the lowest level secure communications method used for private cloud-based services like Salesforce.com and virtually all websites that accept credit card transactions for payment.



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The Old Paradigm

With almost two decades of healthcare IT experience and the expertise of hundreds of clinical specialists, Dell has observed that four major elements are under-emphasized in most of the care transformation approaches used by the healthcare industry. Those four missing elements include:

- **Insufficient Discipline and Rigor** – Too frequently, healthcare organizations initiate care transformation without adequate attention to the discipline and rigor required in pursuing a major, organization-wide change project. Dell' experience reveals that the best results occur when the transformation methodology is applied with "discipline and rigor." This focus fosters an understanding of the needs of clinicians, supports change in clinical processes, and couples performance improvement with effective technology design and implementation. Too often, organizations embark upon major change efforts – such as care transformation – without a clear path for addressing the major issues that will affect implementation. In addition, there is a lack of focus on the value the new technology will bring to improved clinical operations, and an organization proceeds forward with a technology install that is missing critical operational impact analysis. Inflexible and rigid approaches are not attributes that facilitate effective care transformation. The application of good discipline and rigor clearly contributes significantly to successful efforts.
- **Inordinate Focus on Technology** – Value in care transformation initiatives is, typically, derived from a focus on the people and process elements, rather than on the technical deployment of technology. In Dell' experience, as a highly competent, health IT and business process company, far too much emphasis has been placed on the technology of the solution, rather than the people and process issues. While technical competence and effective program management have historically been hallmarks of success in clinical transformation efforts, true transformation of the system will require that more attention be placed on the essential missing elements – people and process improvement.
- **Organizational, Rather Than Person-Centric Focus** – Traditional approaches to managing healthcare information have been focused on the needs of the organization or vendor, rather than the needs of the individual patient. Patients, generally, access care in many different facilities and locations, and by many different methods. Similarly, healthcare workers are mobile, and increasing their flexibility as workers in the environment must be a tactical outcome of any care transformation initiative. Effectively implemented clinical information systems improve care coordination by sharing information anywhere, anytime and anyplace using a longitudinal, person-centric patient data model. In a dramatically changing environment, where consumers are the focus of care coordination efforts, using a person-centric model is an important approach that facilitates an effective outcome from the investment in IT.
- **Inadequate Attention to Metrics** – Finally, far too many organizations pursue large-scale, transformation initiatives without a clear definition of expected outcomes. Effective deployment requires agreed-on metrics that measure care process outcomes and results over time. It is essential for the organization to engage in an internal dialogue on the expected outcomes and to establish clear guideposts for the care transformation effort. Given the magnitude of the investment, the potential impact of the resource on the care delivery process and the implications for the system users, the attention to defining clear metrics is an essential foundation for defining future success from care transformation initiatives.



The following section provides an overview of the Dell clinical transformation point of view, methodology and framework, which was designed to address these important "lessons learned" and to create measurable results from clinical transformation efforts.

Cloud Computing: Less about the name, more about the service

Private cloud: From a presentation layer perspective, a private cloud uses the same technologies and protocols to deliver its service as a public cloud. However, it is established and provisioned within the “four walls” of an enterprise infrastructure environment. These environments are typically referred to as a wide area network or WAN. Such private clouds are achieved in one of two ways:

1. Internally developed clouds are typically called virtualized or shared environments. Implementations of VMWare, Citrix and Terminal Services are examples of private clouds. The shortfall of these environments is in how effectively organizations can provide each of the attributes that define the cloud framework.
2. More likely, a private cloud is implemented by a secure extension of a corporate network into a service provider’s facility maintaining the holistic definition of the customer WAN. This is achieved through the use of traditional network connectivity methods consistent with secure WAN communications. More importantly, service providers are incented to maintain the attributes of the cloud framework.

Hybrid cloud: From a presentation layer perspective, hybrid clouds are described as the combination of both a public and private cloud service environment to deliver a single solution. Examples of a hybrid cloud would be using a private cloud, which contains URL references, to public cloud service or vice versa.

Note: Data integration methods mirror presentation attributes in terms of cloud participation. For example, banks share data traffic, effectively moving money around via public cloud services provided by an automated clearing house. Similarly, businesses share supply chain data in terms of orders, as well as shipment and receipt notifications via public cloud services provided by EDI vendors. In the end analysis, the same principals are provided for data with protocols that mirror the presentation layer examples above.

Adoption Factors – The Risk/Reward of Cloud Computing in Healthcare

A number of industries have proven that cloud computing is beneficial and provides a secure and reliable computing model. How quickly Healthcare will move in this direction seems likely to be driven by the same forces that drove credit card transactions and e-commerce many years ago. Each of the defined tenets within the Gartner framework provide insight into key adoption forces.

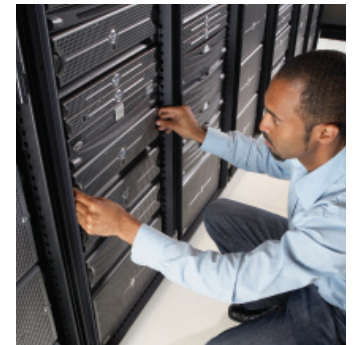
Service-based - Adoption Factors

Adoption of service based offerings in healthcare would seem to be a tremendous asset when you consider it would eliminate provisioning. In terms of effort and calendar time, increased productivity should be targeted as automatic and instantaneous. This is a benchmark satisfied every day by hundreds of thousands of vendors who sell on the Internet.

For cloud based solutions in Healthcare, there are examples of Business to Consumer (B2C) demand in patient portals, and Business to Business (B2B) demand in provider portals. Insurance and Hospitals can not realistically survive without these technologies due to the operational efficiencies they engender and the highly competitive nature of this space. Market demand will also generate requirements in the B2C space with the rise in medical consumerism, patient advocacy, and preventive health policies.

The challenge for Healthcare sector leaders is choosing services wisely while paying particular attention to history and behavior. A few key questions to ask are whether the service provider you are evaluating has:

1. The proper business controls in place to weather peaks and valleys thoughtfully?
2. A business philosophy to always say yes to its customers along with a realistic sense of what’s reasonable?
3. Sensible frameworks in place to balance risk while managing reasonable scalability and elasticity? Case in Point: It may be good that a service provider offers specialization in your field and is not trying to be “all things to all people.”
4. A balanced value of “massively scalable” with industry expertise. (Chances are that you won’t find both of these attributes unless your industry is pure IT service delivery).



Cloud Computing: Less about the name, more about the service



A shared infrastructure to build economies of scale

Economies of scale are only achievable by the largest corporations that have the buying power to demand it. If we further analyze this fact, we quickly find an interesting validation of this premise, which large corporations tend to miss.

Any given solution contains infrastructure (hardware and software), business systems (software and specialized hardware) and services (implementation and support). Many corporations are big enough to gain economies of scale for infrastructure because equipment is often a pure numbers game in a highly competitive and commoditized market. However, as they attempt to move up the value chain to include services such as business systems, they find less commoditization, which means that there are rarely functional equivalents within the market. That means that only a select few organizations have volume enough to drive price efficiencies on their own without the help of a service provider. As you move to the top of the value chain toward implementation and support services, these services rarely commoditize since they represent very disparate value propositions and highly specialized capability delivery requirements. While a few very large businesses may have the necessary volumes of people with skill sets that are "in the neighborhood of the need," the ability to stay ahead of the implementation and support delivery curve for numerous vendor products is far more realistic when entrusted into the hands of service providers who interact with significant volumes of similar customers.

Beyond the economic value of lower component costs created by scale, appropriate weight must be given, particularly over the long haul, to the intangible value a service provider delivers compared to what individual organizations can build and maintain themselves. Implementation and support services can deliver significant cost efficiencies and value potential. Measure twice and cut once is good advice for service-related decisions – the time spent up-front planning and working through requirements usually pays large dividends downstream in smoother and more successful implementations. By following a disciplined approach along with proven methodologies, you can avoid startup errors which would significantly erode the expected efficiencies used to justify a solution's expense in the first place.

Service after the sale in terms of ongoing support for problem resolution, service upgrades and consulting also carry significant value when considering your service partner. Typically the measure of this capability is driven by the level of skills maintained by the service provider, the service organization's delivery model, and a customer-oriented culture proven through past success.

Choosing a service provider should go far deeper than merely pleasing the client CFO - ultimately they too are responsible to the end users in their organization. In a hospital, the meaningful consumers are clinicians and business office staff, probably in that order. An enhanced feature set, solution stability, availability, and mobility will provide significantly higher meaningful levels of clinical satisfaction. This directly impacts the frequency and quality of system resource use within any business – a primary consideration for any CFO. In a hospital this also translates directly to higher quality of records, which leads to higher quality of care, and a higher quality of collection capability in the back office. All of these service improvements are of importance throughout the C-level suites.

Metered with users paying by use

Payment by use typically eliminates up-front investment costs in several key categories, any one of which is significant for a substantive implementation:

Infrastructure: Hardware and software that provision the environment to accept the Business Solution.

Business Solution: Software licenses and specialized devices that deliver transactional business functionality on top of the Infrastructure.

Implementation and Support Services: Labor, tools, techniques, training, and general consulting that establish Implementation and Support Services related to the Infrastructure and Business Solution.

Cloud Computing: Less about the name, more about the service

While one could argue that payment by use only finances costs over the period of use, typically that's not the case when you consider the life of a business solution including the multiple major upgrades that are typically required over a 10+ year period. Keep in mind, the life of a critical business solution well exceeds its depreciation schedule.

It is important to note that there are some exceptions to upfront "set-up fees" under a cloud solution that may remain present, although an increasing volume of service providers are creating ways of eliminating these also. When significant business consulting is required to configure your solution, consulting fees may remain. You may also see a fixed level of consulting fees added into the subscription price that builds in additional services above what is baked in. Most Enterprise Resource Planning (ERP) and Electronic Health Record (EHR) systems require significant configuration that go well beyond pure technical expertise. These are highly valuable added services that should not preclude you from considering a less than pure subscription price model.

In the final analysis, IT controllers and corporate "C suite" members are not used to buying compute resources "as a service" under the expense category. However, the net cost to the corporation should be on par or beneficial when considering all the factors over the time frame in which the business will require the capability under consideration.

Buying computing solutions in a pay as you go model is not appreciably different than paying your electric bill or buying food. When service suppliers are more efficient at producing services in bulk at a more advantageous price point than individuals producing their own, everyone benefits.

Uses Internet technologies

The security and integrity of "shared infrastructure" is a key concern that probably causes the most angst around cloud compute offerings. At the risk of degrading the importance of this concern when considering such a solution for your enterprise, please note that shared infrastructure in and of itself is not a risk. Otherwise we would not trust any bank or e-commerce interface, and we all know that these have proven to be reliable. Before the advent of computers, banks used shared "infrastructure" in the form of account ledgers, or in an even more basic example: common vaults to store assets. The issue is not that infrastructure is shared, but rather your level of confidence in the provider's ability to properly manage segregation of that infrastructure safely and securely.

Private clouds which connect fully secure extensions of a client WAN are the defacto standard for delivery of SaaS to hospitals. Delivery of EHRs in particular is pervasive in the industry today. However, a very large percentage of hospitals also use public clouds to consume or deliver services that are otherwise impractical to consider. Outpatient diagnostic centers share diagnostic results via public cloud access by hospitals. Physicians and patients access patient portals which amount to private cloud solutions hosted by the hospital or their IT service provider.

Public cloud delivery of SaaS is also prevalent in physician offices. Even more closely akin to the average consumer at home, physicians running small businesses as customers of SaaS, are highly accepting of Internet-based private cloud delivery of SaaS solutions.

While global banking and other equally important methods of global business integration rely almost exclusively on public cloud services delivered via the Internet, the healthcare industry continues to see security, stability, service maturity, and a fear of being locked in to one service, as the largest barriers to broader overall adoption.

Without intending to downplay security as an important factor for consideration, many forget that these same exact issues slowed the adoption of credit card transactions via the Internet. While it is true that credit card fraud does occur, that risk has no measurable impact on continued adoption of e-commerce-related credit card transactions. In fact, most would probably agree that electronic-based transactions are more secure than older payment methods such as cash or checks. In today's business environment, businesses that do not offer online payment capabilities are not competitive.



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Assuming standard security and encryption methods are used, it is unlikely Internet service delivery will be the cause of any substantive data breaches by unauthorized individuals. When inevitable breaches do occur, it is also likely that the breach is the result of the same flaws in security practices that make traditional infrastructure and services delivery vulnerable to attack. Vulnerabilities to security of data include locally stored data, weak password criteria, unattended computing devices which can be accessed by unauthorized people, computing resources without appropriate intrusion protection and/or lack of virus protection. These risks exist regardless of one's use of virtualized services.

While not necessarily a security issue, the every day risk to business continuity as a result of system vulnerabilities is also a challenge for solutions that are hosted in a single location. Most organizations have no practical means of affording more than a single instance of a given service when built internally. In-house IT shops have numerous tools that help mitigate this risk through complex and expensive storage solutions, highly available and redundant power/environmental condition controls, clustered computing environments, and in extreme cases (that are increasingly rare), offsite replication to hot or warm fail-over sites. The expense to build and maintain such levels of redundancy is extreme and increasing at a rate that can rival the cost of healthcare itself.

Commonly accepted statistics show that perhaps the largest risk to quality of healthcare is the lack of access to comprehensive medical records to facilitate appropriate care. Adoption of these systems has become a recent focus for healthcare providers, in part because of the incentive funds that were included in the American Recovery and Reinvestment Act of 2009.

Service providers who are in the business of providing solutions "as a service" must be examined for their proven ability to maintain service levels through the life cycle of service adoption and use. To complete this evaluation, business decision makers should look for the following attributes:

1. Domain expertise in both business and technology to craft a solution that effectively satisfies the business need. This attribute should be seen as "table stakes" or you risk the success of an effective implementation.
2. Partnerships loosely crafted between multiple suppliers to deliver or support solutions need to be carefully examined for cohesiveness. There is nothing more frustrating than being in the middle of a finger-pointing battle over who is responsible for causing or fixing a problem.
3. Providers who are recognized for and exhibit a behavior and philosophy to deliver beyond expectations should garner higher consideration to accompany what may be an initially higher price point, that ultimately pays back in fewer problems and greater success.
4. Providers who demonstrate and maintain a technology neutral viewpoint that includes a more objective approach to selecting solutions that best serve the customer and consumer. All solutions are not equal. Choosing a subscription model allows easier migration between solutions as improvements become available without loss of the institutional investment in one solution over time.

The Final Analysis

Today, forward-thinking business leaders are using cloud computing to achieve scalability, agility, automation, and resource sharing. By using a cloud-enabled application platform, companies can implement a hybrid approach to cloud computing that employs an organization's existing infrastructure to launch new cloud-enabled applications. This approach allows IT departments to focus on innovation for the business, while reducing costs over the long haul and automating the management of complex technologies.

In the final analysis, will Healthcare move to broadly adopt SaaS and other cloud based solutions outside their four walls? All indications are yes, once they can sort through the financial questions. When IT is handled through cloud solutions that create added efficiencies and remove management burdens, that frees up resources that are better spent on creating opportunities for direct revenue generating opportunities such as: adding beds, expanding facilities, and upgrading care delivery.



Cloud Computing: Less about the name, more about the service

Cloud Value Proposition for Healthcare

As sweeping healthcare regulatory changes continue to flow down from Washington, providers now have more pressure than ever to automate processes to achieve lower costs and higher gains. These regulations also require adoption of EHRs to avoid penalties and capture increased reimbursements. At a time when adoption of these solutions in a traditional model is cost-prohibitive for many, Software as a Service (SaaS) solutions may be the best viable alternative. SaaS allows faster adoption, lower cost of entry, and more efficient IT cost/resource management over time. The business result of utilizing SaaS solutions, is that a provider's focus can be shifted to their core competency -- delivery of patient care. In addition, through the use of Health Information Exchanges, data integrates more effectively to reduce system-wide costs, increase efficiency, and increase the quality of care.

The use of cloud technologies including virtualized desktops and SaaS means real-time availability of patient information for doctors, nursing staff, and other support services anywhere globally. Disaster recovery plans become far simpler, which eliminates a huge expense and risk because going to alternative sites becomes unnecessary. In cases of a facility crisis or natural disaster, access to your systems is still available from anywhere. Medical professionals can access patient information from any Internet-enabled device without installing software. Healthcare organizations also gain financially by eliminating the large initial cost, plus the time and effort needed to roll out a healthcare IT application under traditional platform architectures. These factors maximize resources and increase profitability for all, reducing the total cost of healthcare system-wide.

Overall the cloud computing value proposition comes down to a reduction of Total Cost of Ownership (TCO) by leveraging the economies of scale provided by service providers, overall improvement of business agility, and ability to adopt enterprise-class systems at a rate not possible in a "build your own" scenario.

- **Reduced Cost**—Reduction in TCO by leveraging economies of scale, pay by the use, and capacity management enabled by the service provider.
- **Reduction in Capital**—Investments are translated from the up-front CAPEX to OPEX while saving overall in the long run. This speeds adoption for more providers lowering the risk in every aspect of the life of a business system. In addition, it provides flexible and significantly enhanced strategies for disaster recovery and business continuity.
- **Agility and Elasticity**—The solution can be provisioned quickly as your business scales up and down, improving your sustainable rate of adoption
- **Global Scope**—A massively scalable engine allows building highly scalable services for clients and partners.

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