



# Parting the Clouds: Demystifying Cloud Computing Options

**All over the world, in organizations large and small, CEOs are looking at IT in a new way. They've heard about the capabilities of "the cloud": inherently flexible, on-demand IT services that are cost-efficient, reliable and secure. And they're wondering why their infrastructure isn't that flexible and why it's taking up so much capital expense.**

It's not hard to understand why this model appeals to CEOs and senior executives alike. They know that business agility is increasingly key to commercial success. With money in tight supply, anything that can cut their capital requirements looks extremely desirable.

Equally, there are good reasons why traditional IT hasn't always been as agile as the business might want; not least is the fact that they can't just throw everything away and start afresh. IT is also constrained by reliability, security, and compliance requirements of the business.

While the technology behind cloud computing is well established, the market is relatively new. New offerings appear all the time, and even the terminology isn't yet universally agreed upon. In this paper we will seek to demystify the options and show that it's possible to achieve the desired increase in responsiveness without compromising the resilience and integrity of the services your IT organization provides.

**As IT departments are asked to cut costs, they are beginning to look at managed services like cloud-based services. The potential benefits to reduce both capital and operational expenses are hard to ignore.**

## **The promise of "the cloud"**

Business leaders may or may not be able to define cloud computing very precisely, but they've likely seen its capabilities lauded in the media.

### **Switch from "just in case" to "just in time"**

If you worked in manufacturing and proposed building a vast warehouse full of inventory that would just sit there until it's needed, you'd be laughed out the room.

Cloud computing represents a shift in IT thinking similar to the just-in-time philosophy in manufacturing. It says that you can stop tying up capital expenses (CAPEX) in IT systems that are under-utilized most of the time. You can get the IT service you need, when you need it, and only for as long as you need it. You can pay for it out of operational expenses (OPEX), and pay for what you use when you use it.

### **Act faster, become more agile**

Business processes and applications depend on IT and networking infrastructures. With cloud computing you can focus on getting that product to market faster, responding to that competitive threat in time, or setting up a new location quickly—without having to invest hugely in infrastructure or deal with delays caused by lack of infrastructure.

**For many organizations, the most appealing feature of cloud computing is the flexible capacity it offers.**

### **Improve business continuity management**

The promise of cloud computing is to deliver on-demand computing capacity reliably. Services delivered from the cloud can be accessed from remote offices, from the road, or just about anywhere there's a good Internet connection. The scalability of cloud infrastructure translates into the ability for service providers to shift resources and route around problems easily. Put this accessibility and flexibility of cloud-based services together, and you've got a highly resilient model for business continuity planning and disaster recovery.

### **Work in new ways**

Organizations are discovering that the scalability and accessibility of cloud-based services creates new opportunities for collaboration—not just between colleagues but by making it easier to open up applications, information, and processes to partners, suppliers, and customers. Because it's fast, easy, and cost-effective to provide cloud computing resources, you can also explore new ideas more readily. Cloud computing is ideal for test-and-development needs: you can call on as much capacity as you need while in development; then, when the project ends, release its resources or migrate to a production environment and easily scale it.

### **The obstacles**

Some IT leaders are already using or planning to use cloud services, while others remain uneasy about perceived risks, including security, loss of control over data, and compliance. Clearly, despite the promise of cloud computing, business leaders responsible for risk management, information security, and compliance have reservations.

#### **Is it secure enough?**

"The cloud" is a shared resource not owned or controlled by your organization, so you may be worried about how secure your data and processes are. Does the service provider maintain its own secure physical infrastructure or will processing and storage functions be farmed out to third parties? How is data secured when it's at rest and as it travels within the cloud?

#### **How do I maintain control of my data?**

Committing customer information, sensitive business data, intellectual property, trade secrets, or legal documents to a shared resource outside the company firewall may feel like too much of a risk. Where will data be stored? Will it remain in country? Will it be moved without your knowledge? How easily can you get your data out of the service at contract end? And how do you know it won't linger on the service provider's infrastructure when it should be removed or destroyed?

#### **Can I prove compliance?**

Industry standards and regulations such as HIPAA, the Payment Card Industry Data Security Standard (PCI-DSS), and Basel II have clearly defined information security requirements. Then there are data protection laws, which differ from country to country. If you don't have control over where your data resides and how it's moved, how can you maintain compliance? What if the service provider changes how the service is provided; would your organization even be notified? What if there's a breach—who's responsible?



### **Will it always perform as it should?**

What if other companies' demands peak at the same time as yours? Does the provider have enough capacity to meet everybody's needs, or will the performance of your applications suffer? Shared services can be vulnerable in this way, as any business traveler using hotel-provided Internet will know—when sharing that service with others, sudden reductions in speed and performance are common. The concern with cloud computing is that your critical enterprise applications might be subject to the same sort of problem because you're sharing infrastructure with others.

### **Is there any commercial flexibility?**

Before Henry Ford introduced the standardized production line, a car would cost about US\$3,000. The Model T cost \$850 in 1909 and just \$440 by 1915. Cloud computing leverages economies of scale to offer the same kind of fundamental cost efficiencies but, as with the Model T, the compromise is that it will become more readily available to businesses of all sizes.

Enterprises have all sorts of differing financial and commercial needs and strategies, and these can change over time. How can you get the commercial flexibility and customization you need from cloud computing?

### **How do we stay in charge?**

Security, control of data, performance, contractual inflexibility and addressing compliance requirements—when it comes to cloud computing these issues have a common feature. They involve giving up control—to a service provider; to a multi-tenant environment; to a standard service. And you may feel that this surrender of control is unacceptable for some of the IT services on which your organization depends.

**Until recently, cloud computing solutions have suffered from a number of shortcomings that have limited their use in the enterprise. Chief among these is that they typically fall short on security, offer inadequate levels of reliability, or limit user control over systems in the cloud.**

### **IT: Cost center or strategic resource?**

Clearly there's tension between the promise of cloud computing and the worries about having sufficient control. This tension is often characterized as a debate between "the business" and "IT."

The pro-cloud and anti-cloud lobbies don't necessarily tie in with any particular roles. Opinions will depend upon the personalities of individual business leaders and their attitudes to change and innovation. It will depend on your industry and the compliance requirements that you're subject to. It's quite possible that the two opposing sides will co-exist in the minds of individual business leaders, whether CEO, CIO, COO, CFO, or anyone else.

How do we resolve the tension? Can we resolve it? Is the problem an intractable one, or can the two sides of the debate be reconciled?

### **Not all clouds are created equal**

Sometimes the obvious needs stating. The concerns expressed about cloud computing assume that all cloud services are created equal in terms of the control (or lack thereof) that they offer over security, performance and a host commercial considerations. This isn't true, as you may suspect if you're at all familiar with phrases such as "public cloud," "private cloud," "hybrid cloud," "enterprise cloud," "commodity cloud," and other variations on the theme.

The industry as a whole is working toward an agreed taxonomy but—understandably in a field as new and as quickly developing as cloud computing—we're not there yet. Until we get there, there's potential for confusion. To avoid misunderstandings, it's crucial to understand the definitions your vendor is using. So let's define some key terms.



### Public clouds: Commodity and Enterprise

Gartner defines cloud computing as “a style of computing in which scalable and elastic IT-enabled capabilities are delivered as a service to external customers using Internet technologies.”<sup>1</sup> Certainly the development of cloud computing has been enabled by particular technological advancements that are now well established. The reference to Internet technologies reflects one of these—the ubiquity of networking through standard protocols. Another common technological capability underpinning cloud computing is virtualization. But cloud computing can’t be reduced to any particular set of technologies.

The concept of the cloud was originally developed to describe what today is most commonly called the public cloud. A central tenet behind a public cloud solution is that it is based on a shared multi-tenant environment. In other words, it offers multiple customers a shared pool of computing resources that can be dynamically assigned and reassigned based on customer demand. There are two notions of a public cloud—the commodity cloud and the enterprise cloud. The commodity public cloud offers raw computing power that is inexpensive and fast—one can typically provision a server within minutes for cents per hour. The enterprise public cloud provides similar benefits but is more secure, flexible, and transparent, and is service-oriented to meet the complex needs of the business.

### Private clouds

The shared, standardized nature of public cloud computing may make this type of cloud unsuitable for some enterprise use cases. For example, some enterprise customers must control where their data resides in order to address privacy concerns. So it’s no wonder that enterprise service providers have responded by developing other cloud-based models.

The table below illustrates the spectrum of delivery models from traditional IT to private cloud.

Defining feature	Traditional In House IT	Commodity Public	Enterprise Public	Enterprise Private
Delivery as a service	No	Yes	Yes	Yes
Self-service	No	Yes	Yes	Yes
On-demand scalability	No	Yes	Yes	Yes
Security	Variable	Moderate	Strong	Strongest
Flexibility	Variable	Moderate	Strong	Strongest
Based on IP technology	Public and/or Private Internet	Public Internet	Public and/or Private Internet	Public and/or Private Internet
Multi-tenant environment	No	Yes	Yes	No
Pricing/contract model	Own assets	Standard Credit Card-Based	Standard Contract-Based	Customizable: Utility, Flat (own assets optional)
Contract/SLAs	Not applicable	Limited	Standard	Customized
Cost	Variable	\$	\$\$	\$\$\$

### Cloud vs. traditional IT

All of these models share some defining features of cloud computing that distinguish it from the traditional delivery of IT and, indeed, from traditional managed services. The three main features shared by all cloud services are:

- **As-a-service.** All cloud computing models are about the “what” that IT delivers—raw computing power, an application, maybe a whole IT-enabled business process—not the “how” of delivery. They’re about having a ready-to-use service delivered to your organization, without you having to worry about infrastructure, capacity, security, or other issues relating to delivery or performance.
- **Self-service.** Users of a cloud-based service access it through an interface such as a web portal. Typically the service interface offers some level of reporting: at the very least, the ability to track usage and billing.

<sup>1</sup> Gartner press release: ‘Gartner Highlights Five Attributes of Cloud Computing’, June 23, 2009



- **On-demand scalability.** In all cloud services you can turn usage up or down easily and quickly; although in a private cloud service, the dedicated nature of the service will almost certainly lead to contractually agreed limits on just how quickly and broadly you can scale the service.

### Commodity vs. enterprise and public vs. private cloud

As well as sharing characteristics that make them cloud models, different cloud models must differ in certain respects. The main differences are:

- **Multi-tenant.** Responding to concerns about shared services being open to all (the “public” in public cloud), service providers have developed cloud-like services delivered from private or semi-private infrastructures. A private cloud service is delivered from an infrastructure completely dedicated to your organization. A public cloud service is what you get when an enterprise service provider creates a cloud service shared by some or all of its customers. And fortunately some service providers offer options in between. For example, an enterprise public cloud provides the flexibility to combine the benefits a shared pool of shared or dedicated server resources with a private network connection.
- **Control.** In a public environment, knowing where your data is and how it is stored can also present challenges. In a commodity public cloud the location of a customer’s servers and data is often abstracted and may, in fact, reside in a third-party data center not controlled by the service provider. With enterprise public clouds, there is a higher degree of control and transparency around where resources are provisioned and who has access; however, customers are still limited to specific data center locations. For enterprises with strict regulatory requirements, private clouds offer the most flexibility in that your service provider can build cloud infrastructure anywhere, so you can store and maintain data in accordance with those requirements.
- **Pricing.** Cloud services are metered, just like a utility, and you pay for what you use. But the dedicated nature of a private cloud service means that the customer and service provider can agree on a different model. Your organization might prefer, for example, to pay your service provider a fixed price for a defined amount of capacity but still charge your own users on a per-use basis. In addition, pricing for private clouds can more easily address trade-off decisions between CAPEX vs. OPEX, depending on the needs of the business.
- **Contract/SLAs.** You can buy many commodity public cloud services online with a credit card. Enterprise public clouds and private clouds require a business-to-business contract which typically has more stringent SLAs and enforceable legal terms and conditions. Most providers are more flexible to tailoring these contracts than would be feasible for a commodity public cloud provider.

### There’s no “one-size-fits-all”

Not only are there distinct cloud offerings, but it’s also important to acknowledge that no organization has uniform IT needs. There is no homogeneous requirement for security or performance that applies to every system, every application or every process in your organization. Any blanket claim about the suitability or unsuitability of cloud computing for enterprises ignores the obvious fact that cloud computing may be suitable for some things and not others.

### Obstacles revisited

Let’s take another, closer, look at the prevailing worries about cloud computing, only this time let’s consider the different types of cloud services and the differences in organizational requirements for different IT services.

#### Data control

There’s no getting away from the fact that, as with more traditional forms of outsourcing, your data will be at least somewhat out of your control if it’s stored in “the cloud.”

But exactly how much control you do or don’t have may differ dramatically with different providers and services. Providers of enterprise public and private clouds may offer a very high level of visibility of where your data is stored and be able to provide complete change management audit trails.

#### Security

If you’re browsing the Internet for news you’ll be quite comfortable doing it through the wireless network of your local coffee shop. If you’re checking your bank balance you’ll probably want to be sure that you’re doing it over a trusted, encrypted Wi-Fi link and a trusted, secure Internet connection. Different uses of technology require different attitudes to security.



The same is true of your organization. You're already using the Internet, a shared public resource, to communicate and transact with customers, suppliers, and colleagues in all sorts of ways. For some things a commodity public cloud service is perfectly secure enough. Many organizations, for example, are using commodity public cloud services for development and testing, using obfuscated data.

Providers of enterprise public clouds and private clouds may have very clear, very stringent security policies and practices specifically to answer their customers' concerns. Many people also argue that cloud services, even public ones, are more likely to be secure and resilient against attack than most enterprise-run IT infrastructures. A cloud service provider may have a larger pool of specialist IT security skills than even the largest in-house IT department; and may be able to detect vulnerabilities and apply solutions across multiple systems more quickly and easily. This will especially be the case in comparison with an IT department that has a complex legacy environment to deal with.

### **Performance**

As with security, your need for particular performance requirements or control over performance will differ depending on the system, application, or process being delivered from the cloud.

The possibility of your systems being affected by other users of the same infrastructure is clearly largely irrelevant in a private cloud scenario. It may be equally irrelevant in an enterprise public cloud scenario. For example, some service providers offer dedicated servers on demand in addition to virtual servers on demand. These server resources are 100% dedicated to a single customer, so there is no shared CPU or shared memory. Enterprise public clouds give you the flexibility to control most aspects of the shared infrastructure, such as configuring bandwidth, load balancing or modifying firewall rules in secure ways that help improve the performance of your business.

### **Staying in charge**

We argued that concerns about cloud computing fundamentally boil down to issues of control. Surely there can be no greater loss of control than having employees bypassing your IT, legal, and purchasing departments by going to a provider of "commodity-style" public cloud services and, with a swipe of a credit card, getting the service they need. While this might be appropriate for small companies, this does not provide adequate protection and control for enterprises.

The reality is that you can't put the public-cloud genie back in the bottle. People are aware of readily available public cloud services, and this makes cloud computing something you have to consider. We expect more and more organizations to establish a legal framework with a designated service provider who can address the broad and diverse cloud computing needs within the enterprise, from simple development projects to complex, mission-critical production systems. You keep control, and your users get the resources that they need.

As organizations seek to realize the benefits of cloud computing we also expect to see a mix of IT service delivery models that include a variety of types of cloud computing. The choice of private or public (whether commodity or enterprise) will come down to your specific needs for specific services and how well the offerings from particular service providers can be integrated with the choices you're making for other services.

### **Easing the "Business versus IT" tension**

What about the tension between the pro-cloud and anti-cloud lobbies, often caricatured as a tension between the business and IT? This isn't a new problem; the underlying issue is the existence of different agendas within the business. We believe that cloud computing will help to resolve this conflict as everybody becomes more service-oriented—IT leaders see themselves as service providers and business leaders as consumers of those services.

Time is also a factor. With time, cloud services will mature and the anti-cloud lobby will become more at ease with the notion of an IT function that they don't own and cannot necessarily even see. The focus will shift to which services are required, not how they are delivered. IT leaders will increasingly focus on what differentiates their business—their applications, processes, and intelligence—rather than staging and managing server, storage, and network infrastructure. With time, too, the pro-cloud lobby—the "business"—will become more IT-savvy; users of technology will be more able to specify what they need in an IT service and understand the reasons for enterprise policies and limitations. We'll see the pro- and anti-cloud lobbies meeting somewhere in the middle.



## Conclusion: 2020 vision

At Verizon we're seeing a huge demand for both public and private cloud services. We think the arguments provided in this paper explain why. Organizations want the benefits of cloud computing: a more efficient IT service delivery model that can enable significant changes in business agility, innovation, collaboration, and cost management. But they don't want to sacrifice the control of traditional IT service delivery models quite yet and the ability to address their unique compliance requirements.

Over time we expect the terms public cloud, private cloud, commodity cloud, and enterprise cloud to disappear. The industry will divide along the lines of markets rather than concepts or technologies. The current focus on public versus private will become more about whether a particular service provider can be trusted to deliver an enterprise-grade cloud service. This is natural as service providers strive to differentiate themselves: some trying to have the lowest costs; others targeting the enterprise market with more differentiated services.

**Cloud computing promises to be the driving force behind the next wave of technology innovation. But it's more than that; it's also a sound business strategy that helps organizations practice better financial management and creates a more sustainable, cost-efficient model for supporting IT services.**

To compete in the mass market, providers will embrace all the tenets of public cloud models, and even push their boundaries. They will focus on standardizing their offerings and delivering them as efficiently as possible.

Providers in the enterprise space will compete on the security and robustness of their offerings. In effect, they will create a continuum of enterprise-class cloud services. They will differentiate themselves on their reputation and the value-added services that they provide—such as orchestration services to help organizations control their various cloud services and consultancy services to help them set their strategy.

We think that companies will shift to using more shared services—just as dedicated point-to-point circuits have been outnumbered by more easily scalable and flexible IP networks. We believe that as cloud services mature and organizations become more familiar and comfortable with them, multi-tenanted services will come to dominate.

In ten years' time we may not even be using the term cloud computing, but what is clear is that we will look back on it as a major evolutionary step in how IT services are delivered and how companies do business.

## Considering a move to the clouds? Let us help.

If you're looking to realize the promise of cloud computing, contact the experts at Verizon Business. We can help you to identify where cloud computing would be appropriate in your organization, set the right strategy, and implement it successfully.

For more information, visit us at [verizonbusiness.com/thinkforward/cloud/](http://verizonbusiness.com/thinkforward/cloud/).

## About Verizon Business

Verizon Business, a unit of Verizon Communications (NYSE: VZ), is a global leader in communications and IT solutions. We combine professional expertise with one of the world's most connected IP networks to deliver award-winning communications, IT, information security and network solutions. We securely connect today's extended enterprises of widespread and mobile customers, partners, suppliers and employees—enabling them to increase productivity and efficiency and help preserve the environment. Many of the world's largest businesses and governments—including 96 percent of the Fortune 1000 and thousands of government agencies and educational institutions—rely on our professional and managed services and network technologies to accelerate their business. Find out more at [www.verizonbusiness.com](http://www.verizonbusiness.com).

[verizonbusiness.com](http://verizonbusiness.com)

[verizonbusiness.com/socialmedia](http://verizonbusiness.com/socialmedia) [verizonbusiness.com/thinkforward](http://verizonbusiness.com/thinkforward)

© 2010 Verizon. All Rights Reserved. WP14498 5/10  
The Verizon and Verizon Business names and logos and all other names, logos, and slogans identifying Verizon's products and services are trademarks and service marks or registered trademarks and service marks of Verizon Trademark Services LLC or its affiliates in the United States and/or other countries. All other trademarks and service marks are the property of their respective owners.

