

Cloud Computing: Public, Private, and Hybrid

a DynaSis 
blue paper

You've heard a lot lately about Cloud Computing – even that there are different kinds of Clouds. And you've got questions:

- » What are the differences between Public Clouds and Private Clouds?
- » What's a Hybrid Cloud?
- » Most importantly, which kind of cloud is right for my small business?

In this paper, we'll explain the different kinds of Clouds to help you decide which approach to Cloud Computing is best for your company.

As anyone who has ever studied the weather knows, there are many types of clouds in the sky:



Cirrus clouds



Stratus clouds



Cumulus clouds

...and others.

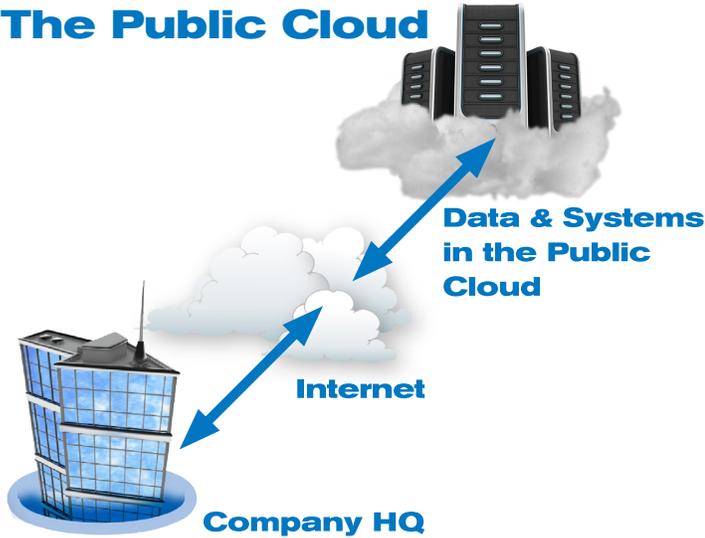
Similarly, there are many types of clouds in the world of Cloud Computing. These include public clouds, private clouds, and hybrid clouds.

The spectrum of possible Cloud Computing models is very broad. The right way to implement Cloud Computing for your business is not necessarily the same as what might be right for other small businesses. Moreover, as your business's needs change, you may benefit by moving from one kind of Cloud Computing to another.

For example, over time, you might move from an in-house private cloud through an off-site Hosted Virtual Private Cloud to public, multi-tenant cloud applications, or a combination of these approaches. In this paper, we'll discuss each of these various kinds of clouds in more detail. The decision on the right model for your business will depend on tradeoffs among the advantages and limitations of each type of Cloud Computing implementation. The journey through these phases can take months or even years, and it's best to go in measured steps. Let's start by discussing the types of Cloud Computing.



The Public Cloud



The public cloud is a series of computing services available on the public Internet. It includes Software as a Service applications such as Salesforce.com or Google's Gmail, software development Platforms as a Service, such as Microsoft's Azure, and Infrastructures as a Service from a wide range of vendors. The major benefits of the public cloud are that it can:

- **Reduce costs**
- **It can improve cash flow by converting capital investments to operating expenses**
- **It is highly scalable**
- **It provides universal accessibility, and**
- **Applications and data are automatically backed up and upgraded.**

However, the public cloud simply isn't the ultimate best choice for every small business.

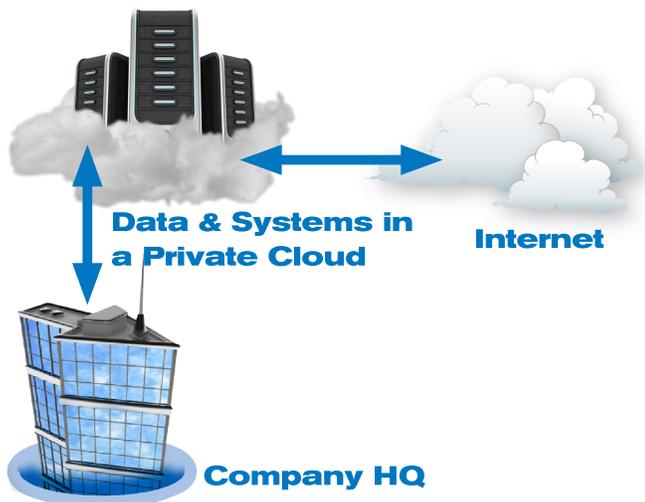
With the exceptions of some new businesses and a handful of existing companies who have implemented brand new systems – no business' data and computer resources reside completely in the public cloud today. One reason is that most Public Cloud applications run on a multi-tenant basis. What this means is that, though your data is segregated from others' data, it is being processed by the exact same instance of application software code that is also being used by dozens, hundreds, or even thousands of other companies.

While this architecture provides many of the efficiencies and benefits of public Software as a Service, it may raise concerns for some businesses. So, leading Cloud Service Providers, such as DynaSis, understand that some companies may prefer to keep certain applications or data on premises.

This preference may stem from having legacy software installed in-house – especially if it requires specialized hardware or operating systems not available in the public cloud. It also could result from having R&D or other highly confidential data which a business is reluctant to process off-site.

This is why private clouds are an attractive solution for many small businesses. Private clouds provide the ability to more directly manage resources that require a higher level of control than is normally available from the public cloud. Yet they still offer many of the benefits of cloud computing.

Private Clouds



Private clouds are those that are built exclusively for a single business. For many companies considering cloud computing, private clouds are a good starting point. They allow the organization to host applications, development environments, and infrastructure in a cloud, while addressing concerns regarding data security and control that can arise in the public cloud environment.

There are two kinds of private clouds:

One kind of private cloud is an On-Premises Private Cloud: This model, also known as an “Internal Cloud,” is hosted within an organization’s own data center. The benefits of a virtualized, scalable, flexible private cloud infrastructure are undeniable.

Building and managing a private cloud enables you to pool hardware, storage, network, Web, and virtualization resources for more cost effective, flexible, dynamic and on-demand requirements. Advances in virtualization and distributed computing have allowed company network and datacenter administrators to effectively become service providers that meet the needs of their “customers” within the business.

Users across the company can have self-service access and increased scalability. Also like a public cloud, a private cloud also makes provisioning an automated service request rather than a manual task processed by IT. It provides a much more standardized set of processes and protection than a traditional in-house IT infrastructure provides. On-Premises Private Clouds are very effective for applications that require complete control and configurability of the infrastructure and security.

Traditionally, in an On Premises or Internal Private Cloud environment, the customer owns all of the equipment powering the private cloud, has complete responsibility for the IT resources as well as the data, and is fully accountable for securing it. So, unlike a public cloud, setting up shop in a private cloud requires expertise with network integration as well as with sophisticated virtualization and cloud platform technologies; you’ll have to run your own hardware, storage, networking, hypervisor for virtualization, and cloud software.

Typically, the internal IT department sets up, tests, and manages the cloud infrastructure. Thus, costs can be larger than choosing a public cloud. You still need to pay for servers and to deal with infrastructure, security, and backup, which in a public cloud is the provider’s job. The result is that large enterprises are the ones most likely to have both the expertise and budget to implement internal private clouds.

A second kind of private cloud is an externally Hosted Virtual Private Cloud: This private cloud model is hosted by a third-party Cloud Service Provider. The provider creates an exclusive private cloud environment and takes responsibility for implementing, securing, and managing the Cloud infrastructure.

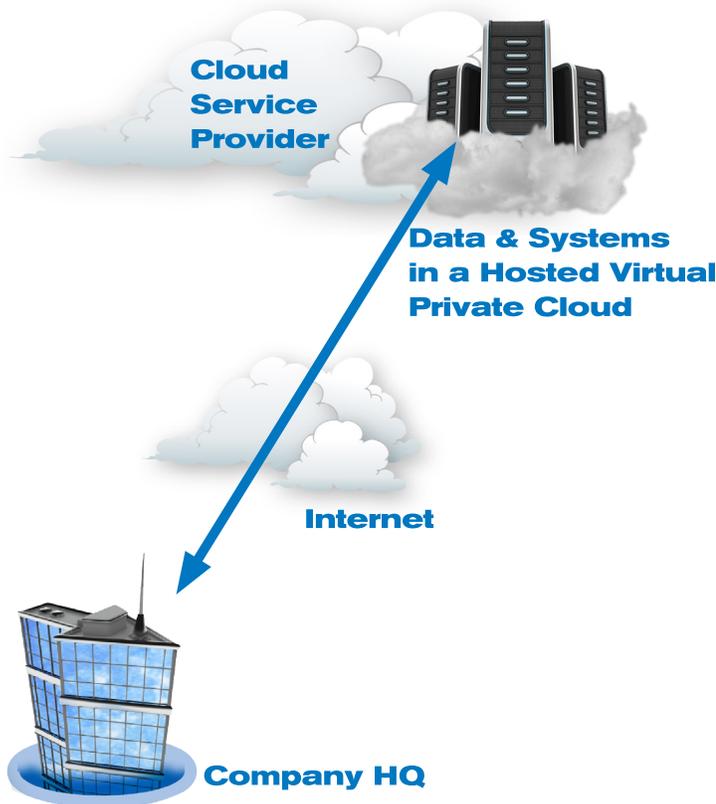
So, there are advantages and disadvantages to both public and private clouds. However, since cloud computing can use both internal and external services, there is also the option of not going completely to either a Public Cloud or an Internal Private Cloud.

Hybrid Clouds

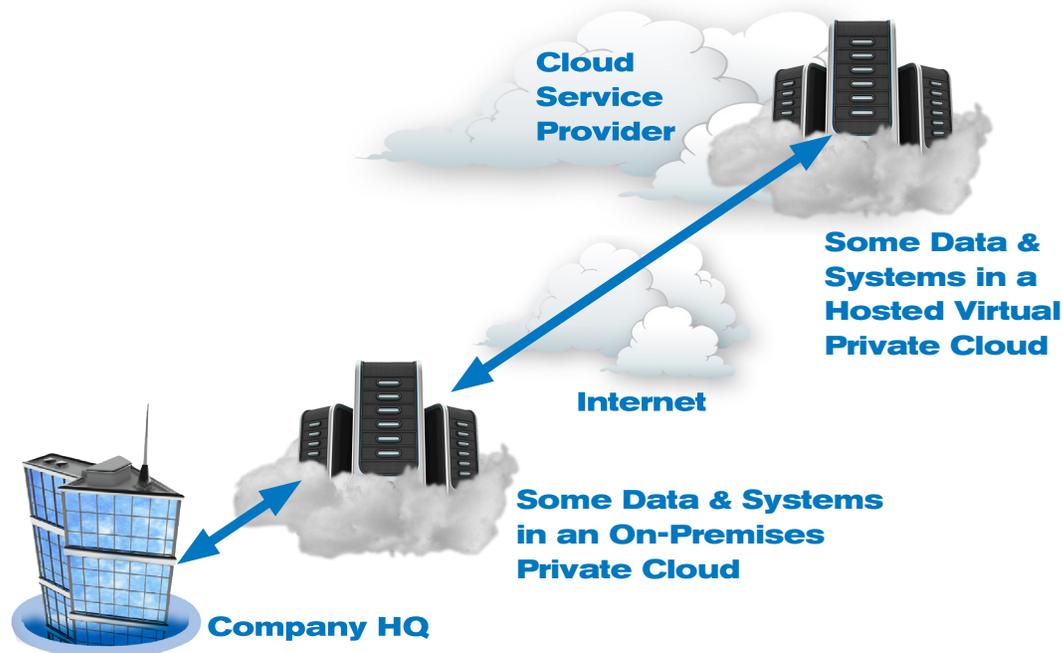
You can choose to maintain some systems and data in-house while using external services where they will be more effective for your business. Such a combined solution is called a Hybrid Cloud.

A hybrid cloud is generally best-of-breed. It combines the comfort level of a private cloud with the flexibility and versatility of the public cloud. Hybrid platforms use either public clouds or off-site Hosted Virtual Private Clouds for some applications and processes. They merge these with on premises private clouds for high-security application environments to leverage the best of both worlds.

As with the private model, in a hybrid cloud, an organization may choose to continue to use their existing data center equipment and keep sensitive data secured on their own network. And like the public cloud, a hybrid model lets an organization take advantage of a cloud's scalability, accessibility, backup, and disaster recovery. It's a way to address some of the limitations of the public cloud while still gaining many of the public cloud's benefits.



This approach is recommended for organizations that want the benefits of moving their infrastructure, systems, and data off site, but prefer not to use a pure public cloud infrastructure with the multi-tenancy sharing of applications. An excellent example of an externally Hosted Virtual Private Cloud is DynaSis' ITility Cloud Solution for small businesses.



One particularly powerful hybrid cloud model for small businesses combines an externally Hosted Virtual Private Cloud with an on premises private cloud. In a Hosted Virtual Private Cloud, the infrastructure has been security-hardened to interoperate with the Internet but to permit only recognized traffic streams. This allows for two valuable services that are difficult or impossible to execute very effectively in a totally on premises IT infrastructure – hosted email and online data backup and disaster recovery, or business continuity.

» Hosted Email

Email is Mission Critical to your business. In fact, because it is used both for external communications with your customers and key suppliers and for internal communications among your team, it may be the single most important system in your business. At the same time, email may well be the most complex and vulnerable system in your business.

For example, while email systems may contain highly secure information within their databases, some components must be able to communicate with the outside world in order

for email to flow. A Hosted Virtual Private Cloud can allow email servers to have strictly limited connectivity to email traffic but otherwise speak only to servers within the on premises private cloud via encrypted communications.

This is very similar to establishing a VPN connection between two sites of an organization. However, here the Hosted Virtual Private Cloud is accessed within an especially walled-off section of the Cloud Service Provider's computer and storage infrastructure which is accessible only to your business unless otherwise specified.

Because, by definition, your email servers must communicate externally, they are continually exposed to the threats of malware, including computer viruses, worms, Trojan horses, and spyware. Many businesses are moving to hosted email services, which are transparent to employees and let management focus on other matters with the assurance that the hosted service is keeping their email secure.

For every legitimate email coming into your organization, your email server must filter out an average of 10 or more spam messages – originated by anyone from unethical marketers to organized criminals, whose full-time



occupation is to outwit your email servers' spam filters and invade your business. Aside from the threat of malware itself, this flood of spam clogs up your bandwidth, making it harder for everything else to get through whether it's legitimate email or prospective customers who are trying to browse your website.

With a Hybrid Cloud solution, you can unload your infrastructure from both the malware threats and the burdensome work load of maintaining your own email servers on-site. Instead, a hosted email service can block malware and intercept most spam before it can overwhelm on premises servers and overflow users' inboxes.

Email also has to run 24 X 7. With multiple, high-bandwidth Internet connections, hosted email services can bring your email in and move it on to you at lightning speed. Industrial grade servers ensure that the horsepower is always there to process your email, clean out the malware, and filter out the spam quickly and effectively, leaving only safe, legitimate email communications to enter your premises.

» **Business Continuity**

Cloud Computing is revolutionizing business continuity for small businesses. The United States Small Business Administration stated that small businesses fall into one of two categories: those that have endured a disaster and those that will. They go on to say that nearly 40 percent of those who go through a disaster will not be able to recover. The threat is real, and small business owners are aware of it. It is critical that small businesses have a current copy of their data stored somewhere safe and accessible.

Even the best run purely internal IT infrastructure retains backed up data onsite where, while secure, it is subject to loss in the event of fire or natural disasters. One of the greatest benefits of a hybrid cloud solution is that, while active

systems can process transactions and current data on premises, archived data can be stored securely off site where it remains safe but rapidly and easily accessible in the event of disaster.

» **Implementing a Hybrid Cloud**

If you were going to implement a private or hybrid cloud yourself, you would need to design, implement and manage a virtual network on top of your existing resources. To provide users with the same features found in commercial public clouds, private and hybrid clouds must perform a number of technically complex tasks. They must provide a uniform, homogeneous view of virtualized resources, regardless of the underlying virtualization platform. They must manage the full cycle of Virtual Machines, including dynamically establishing networks for groups of Virtual Machines and managing their storage requirements, such as deploying virtual machine disk images or creating software environments on-the-fly.

They must support configurable resource allocation policies to meet the organization's specific goals (such as high availability, server consolidation to minimize power usage, and so on). Finally, they must adapt to an organization's changing resource needs, including peaks in which local resources are insufficient, and changing resources, including addition or failure of physical resources.

So, a key component of managing private or hybrid clouds is the management of virtual infrastructure, that is, the dynamic orchestration of Virtual Machines to meet the requirements outlined above. Unless you have already the expertise to do this in house, you will need the support of an experienced private or hybrid cloud services vendor to manage this in order for you to obtain its benefits. Only with this kind of support in place, can small businesses immediately enjoy the full benefits of a hybrid cloud infrastructure without having to implement and administer it themselves.

The DynaSis Option

DynaSis has the expertise and can provide the necessary support through a full portfolio of options to address your IT infrastructure requirements. They can manage your existing IT infrastructure at lower cost through their Digital Veins service. For companies able to take full advantage of the power of Cloud Computing by moving systems and data entirely to the cloud, DynaSis offers their ITility Cloud Hosting solution. With ITility, your desktops and laptops stay, but your servers and the rest of your IT infrastructure reside securely in a Virtual Private Cloud hosted at DynaSis' world class data center.

Finally for small businesses looking to gain the advantages of virtualization and Cloud Computing, but who aren't ready to move their infrastructure entirely to the Cloud, DynaSis offers their new Ascend service. In this utility model, DynaSis installs, monitors, and maintains a complete on-premises hardware and software solution, from servers to desktops, for a low, fixed monthly fee. This simplifies your business

and lets you get out of the rat race of repeatedly buying new equipment and licenses only to replace them again every 3 or 4 years.

Ascend also adds new functionality and capabilities. Your website and your Exchange email server, with spam filtering, are both hosted in the DynaSis data center to ensure maximum uptime. Automated backup of your data into DynaSis' secure Hosted Virtual Private Cloud infrastructure is available. Remote monitoring and maintenance of your entire infrastructure from DynaSis' network operations center (NOC) is included. And users can access the DynaSis helpdesk through a trouble-reporting icon installed on each workstation and obtain 24 x 7 support 365 days a year

If your business needs to cut costs while enhancing quality, increase productivity while responding quickly to the needs of your market, all the while ensuring that your systems and data are secure and confidential, DynaSis may have just the right solution for you. Call DynaSis today to find out.

**DynaSis Can Help You
Gain the Benefits of Cloud Computing.
To Learn More,
Call DynaSis Today!
(678) 373-0716**

DynaSis (www.DynaSis.com) asked Business Technology Futurist Jack Shaw (www.e-com.com) to write this series of White Papers discussing issues in Information Technology and Cloud Computing and their implications for small businesses. For the past 30 years, he has worked with leading edge technologies – from PC's to the Internet. For many years now, he has been working with, studying, and analyzing the business impact of the technologies we now know as Cloud Computing.

This paper explains what Cloud Computing is. Others in this series convey some of the Information Technology challenges faced by small businesses, discuss the benefits of Cloud Computing, explore the various kinds of Cloud Computing, address concerns you may have about Cloud Computing, and describe the ITility and Ascend Solutions which DynaSis offers to help your business gain the advantages of Cloud Computing. Much of the content of this series of White Papers is also available in video form at www.DynaSis.com/videos.

The logo for DynaSis features the word "DynaSis" in a bold, blue, sans-serif font. To the right of the text are three horizontal blue lines of varying lengths, stacked vertically, which serve as a graphic element.