

How To Find The Cloud Through The Fog

a Jargon Buster for Cloud Computing and Virtualisation¹

The IT Industry is full of jargon. As new solutions are developed and marketed new terms are introduced. When a new term captures the imagination every vendor is looking for ways to use that term, and in some cases to redefine it so that they ‘own’ the term. The latest buzzwords that everybody wants to use are related to ‘The Cloud’. This paper is a brief overview of the terms used in the industry, how those terms have developed, what they mean and the practical and commercial implications of what they represent.

From time to time something comes along that is a genuinely new idea or a genuine change in how we work. If you embrace these changes you may reap a real advantage – but you need to know what the advantages are that you expect, and you need to choose a solution that will give you the benefits you want. In this paper we look at the development of Cloud Computing by following the different terms that have been used. We show how these different ways of working can benefit you in the real world by looking at real world examples and highlighting the ‘So What’ factor of each of the terms of jargon that we are ‘busting’.

What’s Where in This Paper

The Terms – Busted	2
The Utility Computing Vision	3
ASP (Application Service Provision).....	3
Benefits and Pitfalls	4
Real World Example Case Study.....	5
So What?	5
MSP (Managed Service Provider)	5
Benefits and Pitfalls	6
Real World Example Case Study.....	6
So What?	6
SaaS (Software as a Service)	6
Benefits and Pitfalls	8
Real World Example Case Study.....	9
So What?	9
Hosted Software	9
Benefits and Pitfalls	10
Real World Example Case Study.....	10
So What?	11
Server Based Computing or Thin Client	11
Benefits and Pitfalls	13
Real World Example Case Study.....	13
So What?	13
Application Streaming	13

¹ Virtualisation – this is normally spelt ‘virtualization’. As with most English words with an ‘ise’ in them either spelling is accepted. In this document I use the ‘s’ form of the word consistently. This is not because the ‘z’ form is incorrect, it is because the ‘s’ form is seen as distinctly British – and I am a Briton.

Benefits and Pitfalls.....	14
(Non) Real World Example Case Story.....	14
So What?	15
Virtualisation	15
Benefits and Pitfalls.....	16
Real World Example Case Study.....	17
So What?	17
VDI (Virtual Desktop Infrastructure).....	17
Benefits and Pitfalls.....	17
Real World Example Case Study.....	18
So What?	18
IaaS (Infrastructure as a Service).....	18
Benefits and Pitfalls.....	19
Real World Example Case Study.....	19
So What?	19
PaaS (Platform as a Service).....	19
Benefits and Pitfalls.....	20
Real World Example Case Study.....	20
So What?	20
The Cloud	20
Benefits and Pitfalls.....	21
Real World Example Case Study.....	21
So What?	22
Buy From a Professional or “Do it Yourself”?.....	22
Software Licensing Considerations	22
Backgrounder: Why is so much jargon used?.....	23
About the Author	24

The Terms – Busted

I will go through a number of terms, explaining the currently accepted meaning (although I accept that others may take a different view) and outline the commercial and technical benefits that this can bring to the companies that adopt solutions based on that paradigm². As many of the terms refer to a paradigm that is an extension of another paradigm I have attempted to present them in an order that allows you to see how the current ‘cloud’ paradigm has evolved – we are effectively following the journey towards Cloud Computing through these various paradigms. Where appropriate I illustrate the benefits of the paradigm by using real-life examples including products and services offered by Online50.

² Some of the terms relate to technology, some to commercial arrangements, and some to a broader approach to implementing solutions. As such I have referred to them as ‘paradigms’ rather than technologies.

The Utility Computing Vision

The journey towards Cloud Computing can be traced back to John McCarthy, an American Computer Scientist, who first put forward the idea of 'Utility Computing' in a speech given at MIT in 1961 to celebrate their centennial year. In the speech he was the first to publicly suggest that computer time-sharing technology might lead to a future in which computing power and even specific applications could be sold through the utility business model (like water or electricity). This idea of a computer or information utility was very popular in the late 1960s, but was fading as it became clear that the hardware, software and telecommunications technologies of the time were simply not ready.

In the vision of Utility Computing people have access to virtually unlimited computing power whenever they need it, by turning on the 'tap' when they need it. This allows companies to largely avoid implementing their own computing infrastructure – using the analogy with electricity they do not need to build their own generator or substation, but they do need to wire up their building. They don't need engineers who can design and maintain an electrical generator, but they do need people who can turn on and use an appliance.

ASP (Application Service Provision)

This term started to be used towards the end of the 1990's and is fairly unpopular today. It refers to making applications available. It was associated with a provider making applications (usually, but not always, their own applications) available for use, and the customer paying for those applications as they were used. Usually the applications were made available over the Internet and the customer paid by subscription. There are clear parallels between this model and the time-sharing or computer bureau model of the 1960's and 1970's and to John McCarthy's vision of Utility Computing. Although at the time people expected the ASP model to do very well specialist ASP providers did not live up to expectations and the term ASP became associated with commercial failure (which is one reason why it is rarely used today).

The core features of an ASP, from the definition given in the IDC's white paper "ASPs Are for Real ... But What's Right For You?" can be summarised as:

- *Application centric.* The core value of the ASP service is providing access to and management of an application that is commercially available.
- An ASP "sells" the application access. Part of the value of the ASP services is that customers gain access to a new application environment without making up-front investments in the application license, servers, people, and other resources. The ASP is able to add this value to these services either by owning the software or having a contractual agreement with the software vendor to license access to the software as part of the ASP's offering.
- Centrally Managed: The application service is managed from a central location rather than at each customer's site.
- One-to-many service. The ASP service is designed to be a one-to-many offering.

- Delivers on the contract. There may be many partners working together to provide an ASP Solution. The ASP is the firm that is responsible, in the customer's eyes, for delivering on the customer contract; that is, seeing that the application service is provided as promised.

There can be clear advantages to the ASP model. Customers can obtain access to software which would be well beyond their reach in a standard up front purchase arrangement. If the terms are right (which would depend on the vendor) they will only pay for what they use, and not have to pay the same amount as a much larger company who would use the software much more but pay the same amount. As such it is a great leveller and when appropriately used it can provide SMEs with the same sophisticated software that corporate use (if they need such software).

There are a number of reasons why many specialist ASP providers failed. Firstly, the commercial model of most IT resellers was (and largely still is) to charge for a sale up front. The reseller incurs the same costs to make a sale of an ASP system, their sales staff want to receive commission, but the revenue comes in over time. Secondly, at the time the available Internet connections were, by today's standards, slow, unreliable and expensive. Thirdly, and perhaps most crucially, it required a change in mindset of the buyer. As some of the core benefits accrue to SMEs it makes sense that SMEs should be the key market, however most SMEs are run by owner managers who are effectively spending their own money. As a generalisation the people who own and run SMEs like to have control and to use an ASP service means handing over control to your service provider. Your data is no longer in your own office. You are not buying computers and programs that you can see.

Benefits and Pitfalls

Rental Model	As the service is charged for by subscription the costs are spread over time. Depending on the contractual terms you may be able to pay for the software you use as you use it. You will continue to pay for as long as you use the service.
Access To Software	Depending on the service that you are using you may be able to obtain access to software that you could not otherwise access. Many ASP services focus on providing best in class applications at a price that is attractive to SMEs.
Shared Service	Most offerings are on a shared system – you will be sharing access to the central resources with other customers. This is normally a benefit as it allows a more robust and scalable solution to be provided than a single customer would merit, but it could be a problem for you if you require absolute dedication of your IT resources.
Contractual SLA	Your provider will provide a Service Level Agreement as part of the contractual terms.
Managed Service	Your provider manages the installation and maintenance of software.

NB: as the ASP model is almost always delivered using Hosted Software, you should also see the benefits and pitfalls of that paradigm on page 10.

Real World Example Case Study

International Traders³ operate in 4 different countries in Europe. Their head quarters is in the UK, they have an administrative office in Italy, and in addition to these two locations they have operatives in Spain and Ireland. As a small company they do not have their own in-house IT resource. They use Online50 to provide them with a managed solution providing Microsoft Office, Exchange email, Sage 50 accounts and Flightdeck CRM which runs their operations, sales and marketing, quotations, order tracking and invoicing. The centrally managed system allows their company to operate from a single set of information that is always up to date for all parties. Importantly they are invoiced for their service on a calendar monthly basis which they pay by direct debit so that if their users change there is a simple adjustment to their bill.

So What?

From our case study we have seen that International Traders³ have been able to implement a fully integrated system that supports their business, including the way they process orders from customers. This has been achieved without them having to purchase any software licenses up front, install and manage any back end servers, or manage a project to ensure their different software packages work together. Online50 just 'make it work' for a fixed monthly fee.

When you are reviewing IT services and expenditure – consider if an ASP model is available and whether that model makes more sense to you.

MSP (Managed Service Provider)

As the term 'ASP' was going out of favour a new term gained prominence – the 'MSP' or Managed Service Provider. These providers typically provided a management function, and would provide an outsourced service that may or may not have included the provision of software. For SME companies who had previously paid for IT support on a 'per incident' basis the appeal of a contract with a fixed recurring cost regardless of level of use was appealing. Such arrangements were commonplace in larger companies, but had not been for SMEs.

Typically an ASP solution was associated with a single application (although some providers will offer multiple applications as required) but the MSP was associated with a 'complete service' effectively outsourcing the management of their customers' IT.

As a typical MSP sale now included an upfront cost for the initial adoption of the customers' systems (or implementation of new ones) it could fit easily into the commercial model for IT resellers. Although an MSP could provide a physically outsourced system (where the applications would run in a hosted environment, and not on the customer's own equipment)

³ We have substituted our customer's real name to protect their privacy.

a large number of providers calling themselves MSPs provided support and management of in-house IT.

Benefits and Pitfalls

Single Contract	Typically a Managed Service Provider will take overall responsibility for the whole of the business function being outsourced, whether it is IT, Finance, Facilities or another aspect of your business. In the IT industry that typically means that your use of your own systems needs to be compliant with their operating procedures.
Consistent Pricing	Within the agreed terms of what is included Managed Service contracts are a fixed and known fee. Make sure that everything you would like to have included has been included.
Commitment	Most contracts presented as 'Managed Service' (rather than ASP) contracts would typically be a three year contract. It may be possible to obtain an annual contract, but shorter contracts (such as monthly) are very rare.

Real World Example Case Study

Andrews Andersen⁴ provide a range of accountancy services to their clients in the north west of England. One of the services they provide is the preparation of management accounts for which they use Sage 50 accounts. Their clients use a wide range of different versions of this software, and Andrews Andersen need to be able to work on any data that they are provided with but different versions of the software can conflict with each other. Online50 provides them with a fully managed environment that allows them to run any version of the software from version 8 upwards (a total of ten different versions at the time of writing). As part of the service Online50 register the use of different client data to particular versions so that the client's data is not accidentally upgraded. Andrews Andersen have a monthly contract and pay a fee based on the number of users of the service and the amount of data stored.

So What?

Using a managed service allows Andrews Andersen to concentrate on the accounting services that they provide for clients, rather than maintaining the accounting software that they use. As different versions of the application can conflict (meaning they won't work properly when installed together on the same computer) they have chosen to use a managed service rather than try to manage different installations in their office.

SaaS (Software as a Service)

The term Software as a Service has been attributed to the SIIA (Software & Information Industry Association) who published a White Paper⁵ on the subject in February 2001.

⁴ We have changed the name of our customer to protect their privacy

⁵ Software as a Service: Strategic Backgrounder by the SIIA – see <http://www.siiia.net>

Although this report is now a decade old and clearly some of the material in it is out of date, other material still remains very relevant. Not only is it accepted as the formal origin of the term 'Software as a Service' but it also covers many of the issues and aspects of the industry. In their paper they state:

"The definitions are constantly shifting, buffeted by the creation of new business models and technologies that companies employ to deliver their vision of software as a service. The marketplace is inundated with acronyms each representing a slightly different approach - application service provider (ASP), application infrastructure providers (AIPs) Internet business service (IBS), business service provider (BSP), solutions service provider (SSP) and more. Therefore, to avoid confusion SIIA refers to the model generally as software as a service."

In this we can clearly see that SaaS was originally coined as a broad and inclusive term. However the term has become generally associated with the use of web based applications (the third of four identified 'application delivery methods' in the above mentioned White Paper). You may see people referring to 'true SaaS' or 'real SaaS' when they mean a web application. The definition of Software as a Service on Wikipedia used to be closer to the original meaning but has now been changed to reflect a skew towards web applications. (Interestingly the article is also currently contested as being unreliable and biased.) Some of the differences between using web applications for SaaS and other SaaS application delivery methods are described below under "Server Based Computing or Thin Client" on page 11 below. It is interesting that web applications, the third of the four specified methods of delivery, is currently the most popular as they are probably the easiest (and therefore cheapest) for the software vendors to develop, provide and maintain but arguably provide users with the least functional experience. There are, of course, very functional web based applications available. As a company Online50 provide SaaS solutions that are web applications as well as other solutions that are thin client (numbers one and three on the SIIA list). We do not (currently) provide SaaS solutions delivered using the other two methods identified in the report: streamed applications and java applications.

In their white paper the SIIA present a Total Cost of Ownership (TCO) benefit to companies implementing SaaS licensed solutions. However I should point out that some of the cost savings they present are unrealistic. For example, they present the SaaS cost as being just the cost of the SaaS service, whereas the in-house deployment cost includes the cost of the hardware and operating system software required to run the application. While this does form part of the total cost, to use any hosted application you must have some in-house IT equipment. If all of your applications are outsourced then you need very minimal equipment, and using second hand or refurbished equipment is viable. These days you can also buy cheap 'Net Books' which may be adequate for running some SaaS delivered applications.

When considering cost you should bear in mind the vendor that you are dealing with. If they are an established vendor with a range of products, some of which may be delivered using either a SaaS or a conventional model⁶, then you should be realistic about the commercial

⁶ For example both Microsoft and Sage provide the same software products on either a traditional desktop license, or by monthly subscription through an authorised partner. Both companies also have other products that are delivered direct to end users on a SaaS model only.

costing of such products. If there is an already established cost for a product then the market leaders will look for equivalent revenue no matter how the product is delivered. Companies which are trying to gain market share may seek to provide unrealistically low prices to capture sales, and this has given rise to a general perception that if something is online it must be cheaper. A brief moment of thought will be enough to realise that buying hosted software means buying the software *and* the hosting and therefore ought not to be cheaper if the software is equivalent. (Although it is possible for the vendor to reduce their costs and they therefore may choose to reduce the overall price of the software.)

One of the key elements of a SaaS based approach is to remove the initial barriers to adoption and so most SaaS offerings will have no up-front expenditure. However the more complex systems (and remember that one of the benefits is to obtain access to enterprise grade software) may well need some initial consultancy work to be properly configured for your own use. In some circumstances there will be a network of 'Value Added Resellers' who can work with you to help you get the most out of your SaaS purchase, but most SaaS offerings are direct from the vendor. By cutting out the channel they are able to recover some of their costs that would have been provided as channel discounts. However, for all but the most basic systems you are likely to need some assistance and the cost of this assistance, if not provided by the SaaS vendor as part of their monthly fee, must be provided for.

In the Online Accounting industry, where Online50 is most active, there are a number of participants. The Internet makes it easy to make a web application available and there are very low costs of distribution for a small SaaS vendor. When choosing a product the choice of vendor is as important as it is for standard software. For example, one vendor claimed that web based software was inherently easier to use than other software and backed this up by saying that nobody had ever been on a Google training course. Now despite the fact that Google do actually provide training on how to use some of their services, it is clearly true that there is an enormous difference between typing in a search term into Google, and ensuring that the way you have coded the VAT on your business transactions will provide a VAT return that is compliant with the HMRC. Basic software has basic features and you may well not need training. If you need something more sophisticated, or you want the reassurance of being formally trained in the use of a package, then make sure you choose a supplier who offers a product that you can easily receive training for.

Benefits and Pitfalls

Single Instance	Generally a SaaS solutions are implemented using a single installation of an application that all subscribers share access to. (This is true regardless of the method of application delivery). This means that you will normally be using the latest version of the application. This can be a good thing but there can be occasions when users do not want to upgrade the software they are using.
Rapid Release	Having centrally managed software means that it is easier for the software supplier to upgrade the software and usually they will provide frequent releases of patches, upgrades and fixes to the software.

Access to Upgrades As the software vendor wants to only provide a single version of their software to all users they will normally include upgrades in the cost of the software rental.

Portable Software ? If an application is only available as a hosted SaaS offering from the software vendor then you will be tying yourself to that vendor's service. Services that allow you to have complete ownership of your data, and to easily use that data on another platform or in-house, are available but are unusual. Most SaaS offerings cannot be run except on the software vendor's system so if you want to move your operations to a new platform you must have your data converted to a useable format.

Real World Example Case Study

Zurich Ventures⁷ have operations in the UK, Switzerland and the USA. Their financial controller is based in the UK and is responsible for the accounts of the whole concern. Online50 provides them with Ambition Accounting. This product is delivered online, either as a web application or a hosted Windows application. The product is a good fit for their needs as it provides support for their operations in different currencies and tax regimes and having it hosted allows them to access the product from anywhere.

So What?

Using a SaaS accounting system allows the whole team to work together from their different locations and time zones. They have chosen a product that is appropriate for their needs rather than settling for one which was inadequate – there is no point in having any product that is inadequate for your needs.

Hosted Software

It is nearly always the case that SaaS (and therefore ASP) delivery provides access to software that is centrally hosted. However I have chosen to include Hosted Software as a separate paradigm for two reasons. Firstly it allows us to consider the benefits and pitfalls of using hosted software. Secondly it is true that some vendors allow you to pay for software by subscription based on how much you use it with traditionally installed software⁸.

With Hosted Software the software does not run on your own computers. It resides on computers that are remote to your business and you access that software from anywhere. This means that you don't have the trouble and expense of installing and maintaining the software, and that you can access the software from anywhere. This is particularly important for today's increasingly mobile and flexible workforce. It makes supporting home workers or

⁷ We have changed the name of our customer to protect their privacy

⁸ For example under the Microsoft SPLA (Service Provider Licensing Agreement) licensing arrangements it is possible for customers to pay for their software licenses on a monthly basis but have the SPLA partner administer software that is installed on their premises rather than hosted.

additional sites very straight forward. It allows users from any location to work on the same software and data at the same time.

However, using hosted software also means that you must have an Internet connection to be able to operate your software. Users who travel may not always have access to a reliable Internet connection – for example the 3G mobile broadband coverage is variable across the UK and even in metropolitan areas the service available fluctuates. The level of service provided by different Internet Service Providers (ISPs) can vary enormously. If you are using a hosted system it is worth making sure that the provider of that system has appropriate network infrastructure in place, and will be able to help you in the event that you have any problems with your connection to the service. Recall the concept of the ‘Managed Service Provider’ – what is the service that your vendor is providing and where does their responsibility end? At Online50 we do not normally provide Internet connections to our customers, but we do have an optional service that provides Internet connections so that where customers require it we can be responsible for the Internet connection (and therefore for their ability to connect to the software) as well as for providing the software that our customers use.

Benefits and Pitfalls

Access Anywhere	Hosted Software can be accessed from anywhere that users can connect to the system.
Common System	With all users accessing the same centrally hosted system you benefit from a common system for all users, and you avoid issues with different software being used by different users or in different locations.
Central Security	If you are concerned about the security of your information then using Hosted Software means that there is only one access point to your information that need to be secured. Implementing security centrally is easier than implementing security on each system that processes data.
Higher Availability	Normally you will find that Hosted Software is provided using a robust, highly available and fault tolerant system that provides higher availability than you can easily achieve in house.
Comms Dependence	To connect to your Hosted Software you are dependent on your communications links. Any problems with your communications may mean that you cannot use your software.

Real World Example Case Study

Atlas Outsourcing⁹ provide an outsourced financial function to companies in the UK. They work for a number of clients that are owned by overseas companies and they themselves use a processing facility in India for payroll processing and occasional accounts work.

⁹ We have changed the name of our customer to protect their privacy.

Online50 provides them with Hosted Software to support their clients including Sage 50 accounts, Sage 50 payroll and Microsoft Office. They are able to share operations as appropriate between the UK and India. Their payroll function can now not only process the payroll, but are also able to print out the payroll reports to a printer in the UK ready for distribution by Atlas Outsourcing staff in the UK. They prepare management accounts online in Microsoft Excel using ODBC to link to live data in the accounts software.

So What?

The use of Hosted Software allows Atlas Outsourcing⁹ to make the best use of their distributed operations and has significantly streamlined their operations. They are able to effectively share work and have increased the level of service they can provide to their customers while reducing their costs.

Server Based Computing or Thin Client

This is the first application delivery method cited on the SIIA Whitepaper regarding SaaS. In this model the software is installed on servers that are located centrally with the service provider. When subscribers want to run the software they connect to these servers. The software actually runs on the servers, and not on the subscribers equipment, but the software is presented to users as though it is running on their own computers and they can interact with the software in exactly the same way as they would if it was running on their own systems. This is also called Thin Client computing because the Client computer only needs sufficient power to be able to display the output of the software and send mouse and keyboard (and possibly other) input to it – so the client device can be said to be ‘thin’ in the sense that there is not much in it. Although specialist thin client devices exist¹⁰ most Thin Client computing uses standard computers for the users. Because the software runs centrally but is presented remotely this has also been called Presentation Virtualisation.

As a thin client only has minimal interaction with the server (showing the screen updates and sending input to it) using thin client application delivery generally does not need a very high bandwidth to operate. However any delays in the connection can result in a low quality experience for users as it takes time for their input to be sent to the server, processed and returned to them. If you think of your Internet connection as a pipe – it doesn’t really matter how ‘fat’ the pipe is (how much data can be pushed through it) but it does matter how long the pipe is (how long it takes for data to cross the pipe).

In contrast with thin client application delivery is a Web Application. (We provide both thin client based services and web application based services to users). Usually users connect to a thin client based service using a web browser, but instead of connecting to an application running at the server, a web application is presented as a web page to the user. This web page contains the user interface for interacting with the application and is loaded each time a user visits the web application. Data for the user is typically received from the

¹⁰ Some hardware vendors make ‘thin terminals’ that are especially designed for use with hosted software. These systems need minimal power and as they do not need to have any moving parts (fans or disks) they are often much more reliable than a typical PC. As they do not actually run software, but only connect to the server where it is run, they should never become obsolete unless you change the technology used to deliver the application.

server, processed in the user interface, and sent back to the server. Although this can be adequate for data processing, and avoids problems where there may be a delay on the Internet connection, generally an HTML based user interface is a much more basic interface than a typical desktop interface using a thin client approach. As the user interface must be loaded by the user then if the user interface is enriched the page will take longer to load. Although it is possible to implement techniques such as delayed loading¹¹ to minimise the amount of time it takes to load a page, the user must still load the page before they can use it. See also the comments on Java Applications and XBA applications under the section called Application Streaming on page 13.

As web browsers become more functional so more advanced and useful user interfaces can be built. As an example of the comparison between using a thin client approach and a web application I was recently looking at the web application of a software vendor we were in discussions with. Each page of the user interface took more than two seconds to load. The software provider brushed this off by saying “that can happen, you just need to upgrade your Internet connection”. At the same time that his application was providing poor performance for a single user, we were using the same shared Internet connection for 14 simultaneous connections to one of our own thin client based services. No users of the thin client based solution experienced problems with the speed of operation. This is not to say that the particular web application was inappropriate or unusable – it just needed the user to provide more resources (and therefore incur more expense) to be able to run it.

The key benefit of using a Thin Client service is that you can (subject to any software licensing constraints) use the same desktop software that you would use on your own local computers as Hosted Applications under a SaaS model. It also means that if you decide that you no longer need to use a hosted service you can (subject to the contract with your provider) simply bring your data back in-house and use the same software installed locally. As you are using established applications there is also typically many more options for integrating that application with other systems than for other types of hosted software, although some vendors have created a platform that allows ‘add-ons’ to be written for their web applications.

There are no practical or commercial drawbacks to using a thin client application unless, of course, a web application is actually a better product for your needs. Some vendors of web applications may make claims that a hosted desktop application is ‘old technology’ but this can be discounted as marketing fluff if the application is a good fit for your needs. It is true that to provide a desktop application in a thin client environment may incur a higher licensing charge as the operating systems of the servers that are running the software must be appropriately licensed. For some applications it may require considerably more resources for a provider to provide you with a thin client application than a web application, but the actual cost difference in terms of their cost for delivery is likely to be minimal – far less than the cost difference of any required software licenses.

¹¹ In delayed loading a minimal web page is initially loaded by the user’s web browser. This then loads additional components of the user interface as the user starts to use them – spreading the delay out over multiple user actions.

Benefits and Pitfalls

Familiar Applications	As you are running software that you can also run on your desktop computers your users will already be familiar with the software.
Portable Data	Because you are using the same software that you can run in-house you will be able to easily move your data between your in-house and hosted systems.
Integrated Suites	It is common place for desktop software to work together with data being used seamlessly by different applications. If you host the same software the same levels of integration can be achieved.
Small Footprint	To access your Hosted Software using a thin client requires very little processing power so that you can use minimal specification PCs or dedicated thin clients.
Minimal Bandwidth	As thin clients only transfer minimal amounts data you only need a low bandwidth (or a thin pipe) to connect to the service. You will get the best experience from the service when information can be passed between your systems and the server very quickly (when you have a short pipe).

Real World Example Case Study

Kingsway Accountants¹² are a full service accountancy practice. From their three offices in London and the home counties they provide a broad range of services to their clients. With a successful outsourcing business they use Online50 to help them work more closely with their clients. The Online50 service allows them to access accounting software running on our servers using thin client technology at the same time as their clients and work on the same data. They make extensive use of Sage 50 accounts, which is ideal for SME clients. Online50 allows them to provide a more flexible outsourcing service to their clients with the work divided between them as appropriate for that client. The licensing terms available through Online50 ensure that sharing access to the same software does not violate the license terms of the software vendor.

So What?

Kingsway Accountants have realised a significant competitive advantage by being able to offer a fully tailored outsourcing service with partial outsourcing (where the client does some of the processing) a very popular offering. Crucially they are able to offer this service using software that their clients already use and are familiar with which lowers the barriers to the client adopting the service.

Application Streaming

The second method for application delivery in the SIIA White Paper is given as 'Hosted Client Computing' where the application runs on the client computer, but is 'streamed' to the

¹² We have changed the name of our customer to protect their privacy

client computer from the server. (These days most people would consider the term 'Hosted Client Computing' to be analogous to a 'Virtual Desktop Infrastructure' which is covered below on page 17). The application is not installed on the client computer and is only present for the duration of the application. Typically this kind of operation requires a very high bandwidth connection to support the initial streaming of the application to the client, and is not normally used in commercial services today. The technology is more likely to be used in a corporate deployment.

Of a similar nature to Application Streaming is the use of a Java Application, given by the SIIA as the fourth method of application delivery. Java Applications run on computers with an appropriate Java Runtime Environment installed. Using a java application is similar to using a streamed application in that the java application is downloaded to your computer each time you need to use it. Java applications are quite common, but I am not aware of any current commercial offering that provides java applications on demand. To make the application a fully functional application would make it too big for repeated downloads to be realistic. The widest use of java applications is as smaller specific components of a web application where certain components of the overall solution are coded in java as the use of HTML is too restrictive.

In addition to java applications there are other similar options like 'XBAPs' (XAML Browser Application) where a web application is compiled into an 'XBAP' to be run as a single unit. Again this has to be transferred to your system each time you want to use it.

Benefits and Pitfalls

- | | |
|---------------------|---|
| Managed Application | As the application is automatically streamed for use and removed after use there is no need to manage the installation or upgrade of the application on your own systems. |
| Single Installation | When the application is prepared for streaming the provider will ensure that every system receives exactly the same application image. |
| Large Footprint | To use this service you must have sufficient computing power available to run the software on your client computers. |
| High Bandwidth | To receive the application you must have enough bandwidth for the application to be transferred or streamed to your users' systems as quickly as possible. |

(Non) Real World Example Case Story

Currently Online50 has no live customers using any kind of Application Streaming solution including hosted Java applications (other than as components of a web application). Due to the nature of this solution (in particular the fact that it requires a comparatively high bandwidth for the initial stream of the application) we are unlikely to introduce any products or services that use this paradigm, or to recommend or implement any solution based on it.

However, for the purposes of illustrating how this paradigm might be used I am presenting the following entirely fictitious example.

Total Fabrication operate an engineering equipment and plant hire business. As part of their arrangements with one of their suppliers they are provided with access to software to provide calibration and testing of the suppliers machines. When Total Fabrication need to use the software they log in to their supplier's website and the calibration software is streamed to their computer. The software sends calibration readings back to the suppliers systems and then, when total Fabrication have finished using the software, it is automatically removed from their computer.

So What?

In our fictitious example above, Total Fabrication have access to calibration and test software provided by their supplier. The software is streamed to their computer on demand, allowing them to run it when they need it, and afterwards removed automatically. This means that total fabrication do not need to install or maintain the software, but they can still use it as required to allow them to test, calibrate and hire out the suppliers equipment.

Virtualisation

Most people think of a computer as being the hardware, but in reality the hardware itself is only important for running the software that you want to run. To all of the software applications that you use the hardware just provides the means to run the operating system environment that the applications need to function. In terms of IT, the process of virtualisation can be broadly summed up as implementing a system using a layer of software instead of a hardware platform. For example normally you would purchase a computer, load an operating system and applications, and then use those applications. What if, instead of having to give each person their own dedicated computer, you could effectively cram more computers into a single computer that you had already bought? Virtualisation does just that. A software layer allows the resources of the computer to be divided so that you can create multiple operating system environments that can all run at the same time if required. This deceptively simple idea has transformed the way that systems are provided and has an essential role to play in the implementation of 'Cloud Computing'. When you consider that computing power is continually increasing¹³, the use of virtualisation allows effective use of the ever increasing capacity of the machines that can be made. It is also a very effective use of the available power – it is much more cost effective to purchase a single computer that is fault tolerant (meaning that it can continue to operate in the event of failure of critical components) and then run five virtual systems on it than it is to purchase five fault tolerant systems. In addition, most systems run well below their peak usage – by running virtual computer on the same hardware you can get better utilisation of your resources. When system A is busy, it is unlikely that all the other systems will be busy as well. This means that instead of systems generally running at 10-20% capacity, systems are running at 50-60% capacity with no noticeable degradation of performance.

¹³ Moore's Law (after Gordon E. Moore, co-founder of Intel) shows that the number of transistors that can be placed on an integrated circuit (and hence computing power) doubles every two years. This has held true for more than 35 years. Although we will reach limitations of current technology within the next 5 years or so, many observers expect that alternative approaches to implementing computing devices will be adopted, effectively allowing the progress of Moore's law to continue.

Virtualisation has become a very over-used word and it is always worth checking what a vendor means when they use the term to describe the capabilities of their products. For example a 'virtual server' may mean a system that allows you to run a web site on a platform that hosts many websites, or it may mean a 'dedicated' implementation of an operating system on which you can run your own applications.

Using virtualisation it is possible to provide very flexible and dynamic scaling, and to allow users to pay for what they need. As an example consider the following common scenario:

A company implements a Terminal Server (Server Based Computing with thin client access) solution to run their business applications. As their company grows they buy more software licenses and all users continue to run on the same server. After they have added a few users their server starts to slow down and they notice that it has become highly loaded. They may upgrade the server (if possible) or they will have to replace it. If the server was implemented as a virtual server the process of upgrading it becomes trivial – they simply 'turn on' more RAM or processors up to the limit of the system that is providing the virtualisation environment. (Actually, they will probably need to shut down their virtual server, then reconfigure the system to use more RAM and/or processors and then turn it back 'on'. Most current operating systems will not cope with extra RAM or processors suddenly appearing out of nowhere!)

The advantage of using virtualisation is quite clear – it provides very flexible configuration cost effectively and as you will buy less hardware you can probably afford to make the hardware more fault tolerant.

The key disadvantage of implementing virtualisation yourself (rather than subscribing to a service that provides you with the capacity you need) is that there is a significant barrier to entry if you want to implement an 'enterprise class' solution for yourself. However if you work with a service provider that allows you to purchase the systems you require under subscription you can still benefit from the flexible and scalable architecture, but without having to implement the whole platform yourself.

At Online50 we offer the 'Elastic Computing Platform' which provides reconfigurable Elastic Computers (ie: virtualised computers) under a monthly subscription. This is a popular and cost effective way to run whatever software you want to (subject to any licensing constraints)

Benefits and Pitfalls

- | | |
|----------------------|---|
| Resource Utilisation | Virtualisation allows a single physical hardware system to host multiple software operating environments. As most systems operate at a low usage level most of the time with occasional spikes in activity this allows these loads to be shared so that the load on the available hardware is more evenly spread. |
| Central Management | The virtual systems can be easily managed by software as they are themselves software definitions of systems. |
| Reduced Hardware | As the virtual systems reside on other systems there are fewer hardware systems to host and manage. |

More Software Cost To enable the virtual environment you (or your provider) needs to have the appropriate virtualisation software. Some systems are available 'built in' to the operating system (e.g.: Windows Hyper V) but there is a cost for the more functional systems.

Real World Example Case Study

Fountainpath¹⁴ are accountants and business advisers operating in the North East of England. They had experienced some technical difficulties with their in-house server both in terms of the server struggling to cope with their workload, and in terms of maintaining their line of business software. Online50 provide Fountainpath with an ECP (Elastic Computing Platform) server that runs their line of business software and can be easily expanded for more capacity as they continue to grow.

So What?

Fountainpath are experts in their field, but they are not experts in IT. By using a virtualised server they are able to access a server that can cope with their current needs and will scale to provide more power as they need it. As they use the server to obtain thin client access to their line of business software they also benefit from having a single point of installation which simplifies the management and upgrading of the software.

VDI (Virtual Desktop Infrastructure)

Building on the Virtualisation paradigm, a Virtual Desktop Infrastructure can provide a hosted platform for the client computers as well as, or instead of, the server computers. Each user would connect to their 'virtual desktop' and run software on the hosted desktop instead of on their own computer. When a 'standard build' of software applications has been identified then a starting image or template can be provided that will provision a new virtual desktop in minutes providing expansion of the system on demand.

Using a Virtual Desktop Infrastructure can significantly simplify the management of systems and can provide added security as no information is ever stored on the actual devices that users use to connect. In many ways it is similar to using Thin Clients, as all of the software is running on the remote computer, with the notable exception that each user is running in their own operating environment rather than in a shared or multi-tenanted environment as would normally be the case in a Server Based Computing thin client scenario.

At Online50 we can provide a VDI system using our Elastic Computing Platform product.

Benefits and Pitfalls

As a VDI is derived from virtualisation, please also see the benefits and pitfalls of that technology on page 16 above.

Scaling Capacity With a VDI you can easily provision more virtual desktop computers as you need them, and delete the virtual desktops that you no longer need.

¹⁴ We have changed the name of our customer to protect their privacy

Simplify Management	Running a number of virtual desktops based on a common image means that each system can be managed in the same way and from the same point – there is no need to maintain separate physical machines.
Avoid Upgrades	As the desktops are virtual systems you will not need to upgrade the hardware of your desktops – you can simply add more power to the virtual systems if required.
Client Footprint	To access your virtual desktop you only need a basic device which can be easily and cheaply provided.

Real World Example Case Study

The Online50 helpdesk provides assistance to users that are accessing our services. Users might be using a wide variety of operating systems and browsers and sometimes our helpdesk has a need to test a particular configuration. Using virtual desktop computers allows us to easily test out new configurations and reconfigure test systems without disrupting our own systems.

So What?

Using virtual desktop systems saves a considerable amount of time as we can deploy a new computer with an installed operating system in minutes. It also saves considerably on space as we do not have to put spare machines on desks around the office.

IaaS (Infrastructure as a Service)

By extending the concept of virtualisation to include everything that a company needs as part of their IT infrastructure, the Infrastructure as a Service model is born. In this model the customer does not need to buy their own data centre space, network connectivity, power continuity systems, servers, backup equipment, network switches, routers and so on. They contract with a provider to supply them with what they need on a flexible, on demand basis. To meet the requirement for elasticity these service will provide a number of virtual servers with both real and virtual network connections as required.

For customers who want to manage their own systems but do not want to manage the physical aspects of those systems (such as where they are located, how they are powered and connected and so on) the Infrastructure as a Service model provides a convenient and flexible way for them to obtain access to their virtual infrastructure.

These services would typically be used by a customer with sufficient skills to administer the systems, but without the desire or resources to actually own the physical systems. This might include IT departments, but the model is also a very good fit for a software company that is providing an on demand web application who does not want to administer their own hardware, but is happy to support and tune the servers used to deliver their solutions.

Online50's Elastic Computing Platform can be used to buy Infrastructure as a service.

Benefits and Pitfalls

Scalable Systems	Using IaaS you are able to easily adjust your computing capacity to meet changing needs.
Convenience	As there is no physical equipment to maintain or purchase IaaS can make it considerably easier and more straight forward to administer your IT systems.
Cost Effectiveness	As the scale of your requirements increase, so too does the cost effectiveness of using IaaS.

Real World Example Case Study

Extended Publications¹⁵ have offices in the UK and USA. They operate a mainstream mid market accounting package where they maintain separate data for both the UK business and the USA business. They had setup their own thin client server to allow the USA users to connect into the UK system but encountered difficulties with the reliability and speed of operation. Online50 has supplied a solution based on our ECP (Elastic Computing Platform) product. This provides them with the capacity they need, both in terms of computing power and network connectivity, and can easily be reconfigured if their requirements change.

So What?

After having tried to implement their own in-house solution, Extended Publications¹⁵ adopted a professionally implemented and managed approach that provided more capacity than they could realistically provide themselves. The system can easily scale to support additional capacity when they need it, something that their own in-house system was unable to do.

PaaS (Platform as a Service)

By extending the Infrastructure as a Service paradigm to include the provision of core software services that support the development and delivery of applications we come to the Platform as a Service model. This is most applicable to those who want to develop software that can be delivered as SaaS or (hosted software). An example of a high profile commercial Platform as a Service offering is the Microsoft Azure platform which provides access to a configured environment that provides web servers, SQL server databases and so on. This minimises the administrative overheads for software developers and allows them run applications on the selected platform without having to be concerned about the administration of the system. Although this can be a very attractive option for the developer, if you are going to be using an application that is delivered on a particular platform make sure you understand the implications of that – are you tied to that platform for as long as you use the product for example.

At Online50 we can provide a range of solutions on demand that fit with the PaaS paradigm. For example we can provide access to databases running on fully managed and fault

¹⁵ We have changed the name of our customer to protect their privacy.

tolerant database clusters (both Microsoft SQL Server and MySQL) that allow customers to just use the database without worrying about the servers the database is running on.

Benefits and Pitfalls

Streamlined Delivery As the platform you are using is actively maintained with spare capacity by your provider getting your service up and running is normally very straight forward.

Minimal Management The standard platform will be maintained with a certain configuration. This means that there will be a limit to what you are able to configure yourself. At the same time you should not need to be involved in the management of the platform – most applications will ‘just work’.

Known Platform Using a defined platform allows software to be developed to run on that platform with the confidence that it will operate as expected.

Portability? If you develop a system to run on a particular platform you may find that you are tied to that platform unless your application is re-written.

Real World Example Case Study

Red Arrow¹⁶ provides facilities management services to a number of local authorities in the UK. As part of these services they have teams of inspectors that carry out on-site surveys. The surveys are entered into a web application that they have had developed especially for their business. Red Arrow were referred to Online50 to provide a scalable platform to host the web application. We have hosted the site on load balanced Microsoft IIS web servers with the data held in a fault tolerant Microsoft SQL server cluster. Red Arrow have also chosen to host windows software for some administrative staff, giving them the ability to query the database directly.

So What?

Using an available platform for service has allowed Red Arrow to gain access to a scalable platform very cost effectively. As Online50 is a multi-service hosting company they are also able to take advantage of using hosted desktop applications alongside their custom web application allowing them to directly access the data collected from their on-site inspection teams.

The Cloud

This has become a very popular term and is being heavily used in advertising campaigns and marketing literature. Although there are certain aspects that make The Cloud separate from all of the above paradigms, it has built on all of them and you will find ‘The Cloud’ used to mean any of the preceding terms rather than the more precise meaning that follows. The National Institute for Standards in Technology (NIST) defines Cloud Computing as:

¹⁶ We have changed the name of our customer to protect their privacy

Cloud Computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.

Which you may think sounds quite a lot like IaaS, PaaS, Virtualisation etc. One of the key words is 'shared' – although several vendors offer 'Private Clouds' which are not shared. To understand how this is a different paradigm consider the following case for a company that develops interactive web sites:

The company has a core system that runs the interactive websites they produce for all of their customers. Each customer they provide a solution for runs on at least two servers but in times of peak demand may need to be run on more servers. Even with a flexible IaaS service they still have to provision another virtual server and set it up, but with a Cloud service they can run the web site on a single server, and tell the Cloud to monitor how busy the server is. If the server becomes loaded the Cloud will automatically provision another identical server to share the load. And when the demand reduces the Cloud quietly packs up the additional server(s) leaving them with just one running.

To make use of some Cloud services you will need to have software applications specifically written to take advantage of the Cloud they are targeted for. Other cloud services may appear like a standard environment to your applications (meaning that you don't have to re-write them) but can spin out additional infrastructure to support your application as required.

Benefits and Pitfalls

Flexible Delivery	Because the Cloud can be used to provide a range of different services you have considerable choice in terms of how your software is delivered. You can use the Cloud to power thin client servers, web servers or other kinds of application servers.
Flexible Payment	You can pay for use of the Cloud on an as-used or on-demand basis which matches your payments to the amount you use the system.
Easy Access	As you access the Cloud over the network (normally the Internet) it is as easy to access as any other online service.
Ultimate Scalability	Key to the concept of the Cloud is the ability to provide additional capacity on demand. This can effectively provide continuous scalability.
Portable Systems?	If you can use the Cloud to run standard software you know you are not tied in to your provider – but if your software needs to be designed for the cloud then you may find you are dependent on the provider.

Real World Example Case Study

At Online50 we have designed and built our systems to meet exacting security and reliability standards. As part of that process we are constantly reviewing and adopting new

technology where appropriate to make sure that our service offering is compelling to customers. In many ways the systems we use fit the definition of 'Cloud' – although when we first designed them the term Cloud was not in use. We can scale out additional capacity easily in all of our production systems. We use a mix of physical systems and virtual systems according to the particular needs of that system. Key clusters that we can add capacity to on demand include our Linux 'web stack' that powers some of our web application services, our load balanced Window IIS stack and the Windows servers that provide access to our managed hosted Windows software service. We run our business on the same infrastructure and services that we provide to our customers.

So What?

Without the use of Cloud technology our business could not function. It allows us to offer very flexible terms to our customers and ensures we can meet our exacting security and availability requirements. When we designed our systems and services we designed them to meet our own needs which could not be met by other available systems at the time. As we continue to refine our systems and services our customers benefit from our ongoing process of continual improvement.

Buy From a Professional or “Do it Yourself”?

Online50 are a Service Provider who can provide you with a range of hosted software solutions to meet your needs. As a professional provider we operate under clear contractual terms and have a measurable SLA. We have extensive technical infrastructure as well as established operating procedures and relevant independent accreditations. If a Cloud, SaaS, IaaS, PaaS, thin client or other Hosted Software solution would benefit your business we would like to provide that solution to you.

Of course, for those with the skills and inclination it is possible to produce your own system that could fall into one or more of the categories here. For example, many companies have a terminal server in their office which allows remote users (and also increasingly users at the central site) to connect to and use the same applications no matter where they are. Remember that while a solution you build yourself may be adequate for your requirements it is unlikely to have the same level of resilience and scalability as a purpose built solution from a specialist. Of course, you may not need the reassurance that comes from using a professional service provider. But if you are concerned about resilience, scalability, security, ease of implementation, or any of the other features associated with a professionally implemented and managed service then you should look for a provider that is suitable for your needs. Make sure that the provider you choose has appropriate software, adequate infrastructure and is experienced with the type of solution you want. With the popularity of 'The Cloud' there are many more people saying that they can give you a 'Cloud Solution' and you should make sure that they can deliver what you need.

Software Licensing Considerations

When you purchase software, whatever the commercial model is that is used to pay for it, you are purchasing a license to use the software and you can only use that software in accordance with the license. If you do not keep to the terms of the license then you have broken the license agreement and you can find that your use of the software is no longer

licensed. If you use software without a license you are committing an offence. Make sure that any software you use is properly licensed to allow you to use the software in the way you want to use it.

Backgrounder: Why is so much jargon used?

In every specialist field there are lots of terms that are used by specialists to communicate precisely and convey an exact meaning to each other. Used well this jargon is very helpful to the specialists and it makes it easier to rapidly exchange information. For example, in the medical profession the exact terms that they use are essential to ensure that a patient receives the correct treatment as quickly as possible.

In the specialist field that is IT there is also jargon. However the industry is very different from my previous example of the medical profession. In IT there is no centrally administered professional body that ensure the knowledge and capability of practitioners – in fact if you know just three things more than the next person you will be considered an expert. In the medical profession the research and development is carried out by specialist companies, is subject to rigorous independent testing in different countries, and then sold to medical specialists to allow them to use the new treatments in appropriate ways. In IT there is no independent testing of new technologies, the companies developing them are then selling them both to specialist intermediaries who advise end consumers and also to the end consumers themselves (most of whom are not specialists). Given the disparate nature of the industry you find that different companies are offering very similar products and services and have a need to try and differentiate those in the market. At this point they may present some of the latest jargon, and give their own slant on the meaning that allows them to show that their solution is ‘really’ the latest, and that other vendors are at best ‘almost’ there.

Even IT specialists can find themselves drawn into a narrow understanding of the technology if they rely on a single vendor view. To illustrate how easy it is for this to happen I have two real life examples. Some years ago one of my colleagues came to see me. He had met up with some friends for a drink and they had briefly discussed a project that he and I were working on together. The project involved the design and implementation of a high performance, scalable and fault tolerant system (which today would probably be called a ‘cloud’). He referred to it as a cluster and found that every single one of his friends told him that it was not a cluster because a cluster was ... and then gave the Microsoft definition of a Windows cluster¹⁷. They were completely unaware of a number of other projects¹⁸ regarded as clusters which went a long way beyond the narrow Microsoft definition. In some of these projects other terms were also used, such as grid computing, parallel computing and so on. My colleague realised that his friends would never be able to take on the kind of project that

¹⁷ Microsoft Cluster Services, renamed (in my opinion more appropriately) in Windows 2008 as ‘Failover Clustering’ provides a way to ensure that software continues to be available if the hardware it is running on fails. Generally it is used with applications that are specifically aware of the cluster, but can be used with other software if appropriately configured.

¹⁸ Such as the original ‘Beowulf Cluster’ built at NASA by Thomas Sterling and Donald Becker. These clusters use a large number of inexpensive PC type systems to create enormously powerful parallel computing environments. Named Beowulf after the hero of the Old English poem.

we were working on because they had allowed their minds to be trapped into a single vendor view of what was possible and how to implement solutions.

My second example relates to how jargon can be misused. As a rule I do not get involved in online discussions and blogs – running a successful company I don't have enough time to stay on top of all the various blogs that are out there. On this particular occasion I was alerted to a comment that had been posted by one of our customers and I was drawn into a discussion with a number of other people involved in providing accounting software using SaaS (Software as a Service). SaaS is primarily a commercial model, not a technical one and when one of the other people introduced an irrelevant technical distinction I called them to task. They conceded that SaaS was accepted as a commercial model but also stated that they and a few other people in 'the industry' were going to redefine the term! There is no benefit to users of making arbitrary distinctions between different implementations. While these distinctions may be of interest to specialists, without any context they make no difference to users and serve only to unnecessarily confuse the very people that the vendors are trying to persuade to buy their products! If a vendor cannot explain the practical and commercial benefits of their products and solutions and have to resort to what I have called 'techno fascism' then surely there is something wrong with their offering. This doesn't mean that the technical aspects of products have no relevance – but let's make sure we understand what the relevance is before being swayed by particular technology.

About the Author

Rob Lambden is the founder and Chief Executive of Online50 Limited. A Physics graduate, his early career included time in sales, software development and product marketing. He started his first company in 1995, selling his shares to co-directors in 2000. In 2001 he founded Online50 Limited (then called IT Inside Out Limited). He has spoken at a number of conferences and events, including for the British Computer Society.

Online50 is a Service Provider that provides a range of online solutions, primarily to SME businesses and their accountants. The product range includes components that can be classified as 'ASP', 'SaaS', 'Hosted Software', 'Server Based Computing', 'Virtualisation', 'VDI', 'IaaS', 'PaaS', and 'Cloud'.

Online50 are primarily involved in the accounting market where they offer a range of solutions including their market leading service for access to the popular Sage 50 accounts software online. In the UK online accounting market Online50 are the only supplier that is a service provider and not a software vendor – we are independent of the companies whose software we make available whereas all of the other suppliers are selling access to their own software and therefore focus on persuading people to use their software rather than providing excellent service to their customers.

For more information about Online50 see the website: <http://www.online50.net> or call us on 0800 195 0835