

Guidelines

F o r I T M a n a g e m e n t



July 2009 – Number 328

Cloud Computing



Since 1966, the National Computing Centre (NCC) has been helping organisations to manage IT processes and systems development and equip people with the skills to ensure business effectiveness. We do this through a unique membership service that brings together professionals and experts to identify, create and disseminate knowledge and experience across the spectrum of IT issues.



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First Published July 2009

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1. Introduction

Cloud Computing is a term that has quickly become the hottest topic in the technology sector, with seemingly every major provider and thousands of smaller companies offering Cloud Computing services.

These Guidelines aim to explain the differences between Cloud Computing subsets such as Software-as-a-Service and Platform-as-a-Service as well as the concerns and considerations that need to be explored before deploying cloud solutions in your organisation.

But what exactly is Cloud Computing?

A recent McKinsey report listed twenty two definitions of Cloud Computing and our research has found as many again. Rather than try to provide the definitive description these Guidelines will define the characteristics of Cloud Computing and the Cloud Computing subsets.

The umbrella term 'cloud' has been used for many years to refer to the interconnecting telecommunication networks which make up the internet. This is the Cloud that we are all familiar with and use when drawing the internet in diagrams. A simplistic definition of Cloud Computing is hosted computing across the internet. An expanded definition is computing delivered as an on-demand service across the internet where the end-user need not have knowledge of the underlying technology or infrastructure.

This definition can be further understood by looking at the fundamental characteristics of a Cloud Computing solution. The end-user company own no physical infrastructure; rather, they rent the computing 'as-a-Service' on a subscription basis. Economies of scale can be achieved by service providers offering this resource from a shared or multi tenanted infrastructure.

At the very heart of the Cloud Computing model is the internet and it has been the increase in availability of stable high bandwidth connections at a relatively low cost which has been the fundamental enabler for the growth of Cloud Computing.

The concept of shared centralised computing resource accessed by many is not new. In 1961 John McCarthy of MIT first publically suggested this model, and the idea of utility computing grew in popularity during the 1960's. After fading from popularity for some decades the concept resurfaced in the late 1990's in the form of Application Service Providers (ASP). Companies such as IBM and Oracle launched ASP services and yet the vast majority of ASP services failed to gain any real traction. The ASP model was seen by many as a failure and is often still cited as a cogent paradigm of why Cloud Computing will never become ubiquitous; however there are a number of major differences in the model and the approach of companies offering Cloud Computing services.

Under the wider Cloud Computing banner there are a number of subsets. These include Software-as-a-Service (SaaS), Platform-as-a-Service (PaaS), Infrastructure-as-a-Service (IaaS). Within these there are further sub sets such as Desktop-as-a-Service (DaaS) or Storage-as-a-Service (which is also abbreviated to SaaS) and even Everything-as-a-Service (EaaS as defined by HP).

What is clear is that with no universally accepted definition of Cloud Computing and an array of acronyms, some of which never enter wide use, it can be very difficult for anyone to make an informed decision on which service is right for their company.

2. Defining Cloud Computing

When developing the earlier definition of Cloud Computing (any service delivered as an on-demand service from a Hosting Centre across the internet) it is important to look at why this model is different to traditional managed hosting services.

'The umbrella term "cloud" has been used for many years to refer to the interconnecting telecommunication networks which make up the internet'

In Cloud Computing the service is sold on demand, on monthly hourly rates or even by the minute. It is a scalable, elastic service, enabling the end use company to consume as much or as little of a service as they need, when they need it.

Within Cloud Computing a cloud can be either public or private. Public Cloud providers typically deliver services to organisations across an internet connection. A Private Cloud is a network or data centre that delivers hosted services to a specific organisation or group of users. It is possible to create a virtual private cloud by utilising Public Cloud services to produce a Private Cloud. A driver for Cloud Computing has been the virtualisation technologies from companies such as VMWare, Citrix and Microsoft's Hyper V.

The Software-as-a-Service cloud model (SaaS) is the most recognised incarnation of Cloud Computing. In the SaaS model the Service provider owns and operates the hardware, infrastructure, the software licences and the service is made available through a web-based login. Management of the service is usually achieved through a web-based portal.

There are many examples of SaaS solutions, from Hosted CRM Solutions such as Salesforce.com or Microsoft Dynamics, to back office application provided by companies such as Net Suite, through to accounting packages such as Sage 50 Online.

A very established example of this is Microsoft Hosted Exchange, which is provided by SaaS providers such as USA.net, Intermedia and Nasstar.

Many companies will have been using a web-based or SaaS application within their business without appreciating that they are already embracing Cloud Computing.

A recent addition to the Cloud Computing landscape is Microsoft Online Services. This offers Exchange email, SharePoint and Office Communication Server on a per user per month basis directly from Microsoft. These services are Hosted in Microsoft's own data centres and billed by Microsoft. They are seen by many as validation of the cloud model.

Platform-as-a-Service (PaaS) is where a PaaS provider enables product development tools and Software on their hosted infrastructure. With PaaS developers can build any application, any database or any logic, and run it on the PaaS infrastructure.

PaaS enables operating system features to be upgraded and changed frequently. The centrally hosted nature of PaaS enables development teams to work across multiple locations on the same project. It also eliminates the need for each site to have expensive development platforms on each site.

Examples of PaaS include the Google App Engine, and Microsoft Azure.

An established PaaS service is Force.com which is a part of the Salesforce.com company.

Infrastructure-as-a-Service (IaaS) offers computing power, storage, and networking as a service over the internet. Originally called Hardware-as-a-Service, Infrastructure-as-a-Service is now the more common term. End user companies use the IaaS provider's application program interface (API) to deploy services such as virtual servers and storage. In the IaaS model, Cloud Computing allows a company to only pay for as much capacity as is needed, and bring more online as and when required.

Examples of IaaS include Go Grid and Mosso/Rackspace.

Amazon Web Services including EC2 is the best known IaaS provider.

'Many companies will have been using a web-based or SaaS application within their business without appreciating that they are already embracing Cloud Computing'

3. Software-as-a-Service (SaaS)

Software-as-a-Service is a Cloud Computing subset that is familiar to most people. In this model the SaaS provider delivers an application on demand over the public internet. The term Software-as-a-Service was coined around 2001 and came into common acceptance in 2005, when many companies which had referred to themselves as an Application Service Provider (ASP) started to call themselves a Software-as-a-Service provider.

The common characteristics of Software-as-a-Service are:

- Network-based access to commercially available software/application, typically over the public internet.
- Centrally hosted as opposed to individual onsite deployments.
- Multi-tenanted platform; although this is a defining characteristic of SaaS many customers are not aware whether their service is delivered from such a platform and consider applications matching the other characteristics as SaaS.
- Centralised feature updating. Making the latest version of the service/application available to all users at once. Removing the need for end user patching.
- Charged on a per-user per-month basis, often with a very low commitment level.

3.1 Adoption

While Software-as-a-Service has been available for some time its adoption has accelerated over recent years. Some of the reasons for this include:

- People are more familiar and comfortable with internet-based applications. A new generation of users brought up on Hotmail, Facebook and similar applications ask why you would host things in house?
- Computing is now not the preserve of large businesses. Companies care about their data and how they manipulate it, rather than the infrastructure below it.
- The pressure to reduce costs means that companies look for viable alternatives to expensive in-house projects.
- Most business applications are standardised so users can switch from platform to platform as long as the application is the same. e.g Microsoft Exchange and Outlook.
- Software vendors changing licensing models.
- Stabilisation of hosted services.
- Increased availability of stable bandwidth at lower costs. The introduction of unbundled broadband services, from companies such as easynet has made high bandwidth ADSL and SDSL available across the country.
- Enabling small and medium businesses to access services that hitherto have been the privilege of enterprise.

3.2 Objections

Software-as-a-Service brings many benefits to a business but it is not without some limitations, which may act as a barrier to adoption.

- The very nature of SaaS requires connectivity to make it viable. There are still black spots in network coverage. Bonding DSL lines often does not produce good enough quality connectivity and some sites may be too far from the network to receive high enough bandwidth. Your solution may be dictated by the performance of the lowest bandwidth site.

- SaaS applications are standardised, designed to match the requirements of the majority of users. However, you may require customisation that is not available.
- Adopting a specific SaaS application may cause vendor lock in.
- Risks of outsourcing data to a third party.
- Lack of confidence in SaaS providers as viable businesses. Outside of the large providers there are valid concerns about the long-term viability of providers as many are only just out of start up phase.

3.3 Examples of Software-as-a-Service

Hosted Exchange

Hosted Exchange is the SaaS delivery of the Microsoft Exchange platform. Billed per user per month, providers deliver the service from a multi-tenanted Hosted Messaging and Collaboration platform.

First released in 2005, Microsoft's Hosted Exchange Platform was many companies first introduction into what is now known as Cloud Computing. Microsoft designed the hosted messaging and collaboration platform, now on version 4.5, and this was released as a blueprint to hosting providers. The solution offered enterprise grade email with all the functionality of an in-house exchange server.

Hosted Exchange providers added additional services such as anti-virus and anti-spam, archiving and Hosted BlackBerry Enterprise Server.

The original target market was seen as sub 50 users, but this has now grown and many companies in the mid market have outsourced their email to a Hosted Exchange provider.

Providers include: BT, Cobweb, Fasthosts, Nasstar. Companies using the service include United Airlines and Innocent Drinks.

Salesforce.com

Salesforce.com is a SaaS CRM system. The service is charged per user per month.

Before Salesforce.com, CRM was delivered internally from a server or in many instances companies relied on Outlook and Excel spreadsheets for tracking sales contacts and opportunities.

Salesforce simplified the adoption process by allowing the Sales Director to adopt the service by passing the IT department. The simple per user per month model is easy to budget for and the ability for field sales people to be able to log in from anywhere (including from a mobile device) means a more productive work force.

For five or below users, Salesforce has a team version that is £10 per user per month. Above five users this price increases but enables additional features to be added via the App Exchange.

The service is available directly from Salesforce or via a partner who may provide consultancy and customisation. Companies using the service include Boots and Dell.

Nasstar Hosted Desktop

Nasstar Hosted Desktop is the SaaS delivery of the business desktop including the Microsoft Office 2007 Suite. Charged per user per month, customers can add additional line of business applications such as Sage.

As part of the growing trend for Virtual or managed desktops, the Nasstar Hosted Desktop service offers a standardised enterprise delivery of the business desktop. Companies report a saving of between 25-40% over traditional IT.

The service was recognised by CNET in 2008 as Business Application of the Year. Companies using the service include easyGroup and Allied Healthcare.

'Outside of the large providers there are valid concerns about the long-term viability of providers as many are only just out of start up phase'

4. Platform-as-a-Service (PaaS)

Platform-as-a-Service (PaaS) is the delivery of a computing platform as a service. It negates the need to purchase and manage hardware and software while facilitating deployment of applications. PaaS provides the facilities required to enable the building and delivery of web applications and ultimately delivery; entirely available from the Internet eliminating software installation for developers, IT management or end-users companies.

PaaS providers offer application development, testing, deployment and hosting as well as application services such as team collaboration, web service integration, database integration, security, scalability, storage and application versioning. By providing these services development times can be dramatically cut.

The common characteristics of Platform-as-a-Service are:

- PaaS provides a company with the ability to develop, acceptance test, publish, host and support applications in the same integrated environment.
- Multi-tenant architecture – enabling the deployed application to scale while keeping control of costs. This also may facilitate additional security, scalability and management.
- Mash ups – PaaS enables integration with additional web services and databases.
- Team working – Developers working on the single PaaS platform can be spread across multiple geographic regions.

4.1 Adoption

PaaS has a strong take up in organisations that have a distributed development team, enabling them to work together on projects.

Cost reduction is a strong driver for PaaS adoption. Utilising a single platform that is pre-built with security, resilience and reporting enables developers to remove the cost of hardware and internal resource needed to deploy and manage a solution.

Enabling not just the developers but also the users to have an involvement in the development and respond more quickly to their feedback.

Developing applications for specific platforms to reach an existing market.

4.2 Objections

Trust is still an issue for some companies when evaluating the feasibility of Platform-as-a-Service. Whether it is concerns about security or the long-term viability of the PaaS provider, many are happier to continue working in-house as that is the approach they have always taken.

The PaaS provider may have propriety interfaces or development language that may in effect cause a tie-in to that provider.

There may be limitations in the levels of development and customisation that can be achieved on a PaaS platform.

4.3 Examples of Platform-as-a-Service include

Azure Services Platform

Microsoft's Cloud-based development platform was released at the 2008 Professional Developers Conference. Windows Azure is a cloud services operating system that serves as the development, run-time, and control environment for the Azure Services Platform. Windows Azure provides developers with the on-demand computing power and storage to host, scale, and manage Web applications on the Internet through Microsoft data centres.

The Azure Services Platform provides a range of functionality to build applications that span from consumer web to enterprise scenarios and includes a cloud operating system and a set of developer services. Fully interoperable through the support of industry standards and web protocols such as REST and SOAP, Azure services can be used individually or together, either to build new applications or to extend existing ones.

Windows Azure is an open platform that will support both Microsoft and non-Microsoft languages and environments. To build applications and services on Windows Azure, developers can use their existing Microsoft Visual Studio 2008 expertise. In addition, Windows Azure supports popular standards and protocols including SOAP, REST, XML, and PHP.

Microsoft Azure will be commercially available at the end of 2009.

Force.com

Force.com is Salesforce's PaaS service. Force.com was the first widely accepted PaaS service.

Force.com has developed an almost evangelical following and is keen to foster a feeling of community. At its core Force competes as a development platform with .NET, Java, etc. Salesforce also has VisualSource, a set of tools that allows developers to build applications for multiple devices such as iPhones and add HTML, AJAX and Flex to Force applications.

It currently runs all of the Salesforce CRM apps, over 800 ISV apps like those from Thompson, Fujitsu and CODA and over 70,000 custom apps used by over 47,400 customers such as Dell, Cisco and Symantec.

Google App Engine

Google App Engine is Google's PaaS service for developing and hosting web applications in Google-managed data centres, released as a beta version in April 2008. Its billing works in per day or per minute quotas.

Google App Engine enables developers to build web applications on the same scalable systems that power their own applications. It gives a fully-integrated development environment.

The service is free for developers to get started, supporting up to 5 million monthly page views for free. After this it falls into the standard usage based model.

5. Infrastructure-as-a-Service (IaaS)

Infrastructure-as-a-Service is the delivery of computer infrastructure as a service. The term has been in use since 2006. With IaaS, customers purchase resources instead of purchasing servers, software, space or network infrastructure. These services are typically delivered from a virtualised platform. Billing for the IaaS model is usually based on usage.

An Infrastructure-as-a-Service usually consists of computing power paid for on a usage basis, virtualised servers – which can be deployed very quickly giving almost instant scale – networking equipment and connectivity. It is clearly essential for there to be an all encompassing Service Level Agreement with any IaaS service.

5.1 Adoption

Infrastructure-as-a-Service is still in its infancy, although companies such as Savvis have won large contracts so it is moving in from traditional managed services. The billing model is far more granular and sophisticated and the implementation of a service far faster.

Currently there are a growing number of companies who are exploring IaaS. Market leaders such as Amazon are only now providing resources outside of the USA.

While it may not yet be an obvious move for companies running their own data centres it certainly is an attractive option to start ups, and the low cost of entry and the ability to scale means that some more established companies may face competition from smaller start ups.

5.2 Objections

Infrastructure-as-a-Service is a highly complex offering. However, it is not customisable and you are limited to the operating systems and images provided by the IaaS provider. This means moving existing systems into the cloud by IaaS will run into problems. Designing a solution from scratch to work within the parameters set by the IaaS provider may not be practical. An example of this is Amazon where they do not yet have availability of Microsoft Server 2008.

However, many of these objections will be overcome and disappear over the coming year or two.

5.3 Examples of Infrastructure-as-a-Service

Amazon EC2

Amazon elastic Cloud became publically available in October 2008. EC2 offers virtual machines, called 'instances', in one of three sizes; small, large or extra large. Amazon.com sizes/instances are based on 'EC2 Compute Units' — the equivalent CPU capacity of physical hardware. One EC2 Compute Unit equals 1.0-1.2 GHz 2007 Opteron or 2007 Xeon processor. Amazon.com provides persistent storage in the form of Elastic Block Storage (EBS). Users can set up and manage volumes of sizes from 1GB to 1TB.

The two elements that make up Amazon pricing are data transfer charge and hourly charge per machine.

EC2 service offers Linux and Sun Microsystems' OpenSolaris and Solaris Express Community Edition. In October 2008, EC2 added the Windows Server 2003.

Amazon hosts on the east and west coasts of the States and also in Dublin. In each location it has two independent data centres so you can have resilience without the need for transatlantic traffic.

The Amazon EC2 service has a growing portfolio and has recently introduced price reductions for committed usage.

GoGrid

The GoGrid IaaS offering hosts Linux and Windows virtual machines and is managed by a multi-server control panel. San Francisco based GoGrid are a division of Serverpath managed Hosting.

GoGrid have a very user-friendly web interface, which even less technical staff can navigate. You are able to add virtual servers, databases and load balancing to your solution through the web-based portal. Unlike Amazon the GoGrid service also charges for RAM.

GoGrid offer storage as a part of the solution, available from \$0.15 per GB per month.

6. Things to consider when selecting Cloud Computing services

When selecting a Cloud Computing provider a number of considerations need to be explored. Matching technical requirements is only a small part of the picture. The first thing to understand is that the Service Level Agreement is not only essential in Cloud Computing but is effectively what you are purchasing.

Service Level Agreement

Many hosting SLAs have traditionally covered 'power and ping' meaning that the provider guarantees server availability but not necessarily performance. With a Cloud Provider availability is just the starting point. If your company is going to be relying on the Cloud-based service, availability must be matched by performance guarantees to ensure your application or service is usable. If aspects of the service are critical to your business function then you should request these are itemised and included in the Service Level Agreement

'Infrastructure-as-a-Service is a highly complex offering. However, it is not customisable and you are limited to the operating systems and images provided by the IaaS provider'

A Cloud Computing provider should be able to provide you with their performance against Service Level Agreement for the past 12 months. This report should also include details on any SLA breaches and their resolution times. While most Cloud Computing providers offer compensation against SLA breaches, unless these penalise the provider to a point of being painful, they will not necessarily consider a breach to be as critical as you do.

Changes to staff roles

When outsourcing elements of your company's technology to a Cloud Computing provider the role of IT Management may change. The relationship between provider and customer needs to be managed. Understanding how the provider manages their customer relations will indicate to you if you feel comfortable working with them.

The very nature of the Cloud Computing model may mean a reduced requirement for internal resource. Staff may be redeployed or removed from the business. In challenging times for the business Cloud Computing may be an enabler to achieve more for less while providing the same levels of internal service level guarantees.

Support

As you will be one step away from your application or service the support your Cloud Computing provider gives you will be an extension of your own team. The support levels available from Cloud Computing providers vary widely.

Many providers automate the support process to enable them to reduce overheads and streamline their processes but these need to be backed up with the ability to talk to an engineer if and when required.

During the design and implementation phase if a provider makes presales and project management resources available. This approach will most likely be carried through in their after sales support.

Selecting a provider in a different time zone may impact on support availability and response.

Integration

The multi tenanted nature of Cloud Computing solutions often mean that the ability to customise and integrate into other applications is very limited. Even a simple plug may not be able to be installed on a Cloud Providers service. During the evaluation phase do not make assumptions, specify that these are addressed up front by the technical team and do not rely on the word of a commercial representative.

Interoperability

Applications designed on one platform may not work on another platform and there are currently no agreed interoperability standards although many providers are currently discussing adopting standards.

Performance

By understanding the Cloud Computing provider's infrastructure you will gain an insight into the likely performance. However, only by testing the service can you guarantee performance. If you have a geographically split workforce, then test across each of the regions. Test with the different access methods you will be using.

Ask the provider about the utilisation of the platform and their ability to scale to ensure that you will continue to receive satisfactory service levels.

Management and control

It is typical that the Cloud Computing provider will supply you with web-based management tools. These will largely be your only access to the service so explore these in detail to make sure that you have the access levels you require to manage your service. In some instances you may actually require very little functionality so look for what you need to do rather than multiple customisation options.

Ask about the provider's internal security policies relating to who has access to the management and data of the service is available. If you have sensitive data you will want to ensure that this cannot be accessed by third parties. A simple enquiry into the background checks taken when employing staff can often lead to a clear picture of how the integrity of your data security is viewed by the provider.

Regulatory compliance

Your business may require regulatory compliance and your Cloud Computing provider should have an understanding of your legal requirements. The provider should be willing to undergo external audits.

It is advisable to ask for customer references from their existing clients with in the same sector.

Cloud Computing providers holding your data may be required to hold ISO 27001- Information Security Management. ISO 27001 is the internationally recognised standard for certifying that a provider's Information Security Management System (ISMS) protects its information and that of its customers.

Data location

The location of the data storage can have an impact on your business. You may find that your data is stored outside of your own country and may then become subject to local data protection laws.

The physical location of the data may also have an impact on service performance. Factors such as latency could have a serious negative impact on the service levels and the end-user experience.

Data segregation

One of the defining characteristics of Cloud Computing is multi tenancy where a single instance of an application runs a single infrastructure servicing multiple organisations.

It is therefore important to understand how the data is segregated. It is also important for the data to be encrypted at all stages and that the encryption schemes were designed and tested by experienced professionals

Data recovery

In the event of a disaster you will require your data to be restored. While the provider will offer a back-up many do not give guarantees to data restoration. Understanding the back-up policy, what is being backed up and whether the provider will provide a complete restoration, is essential before entering a contract.

Some providers may provide geographically diverse resilience as standard or as a chargeable option. Some providers will simply back up to tape. If this tape is stored off site there may be a delay in retrieving the tape.

Long-term viability of the Cloud Computing Provider

With many Cloud Computing providers being new companies it is advisable to understand their financial position and how they are funded. If your chosen provider ceases to trade what happens to your data, will the data be returned to you and if so in what format and what time scales?

This should be detailed in the contract.

Data availability

In the event of a failure of the Cloud Computing provider you will require the ability to move your data to a different provider and/or different platform. This failure may be a short-term issue, in which case the provider may offer replication of data to a secondary site as standard or as a chargeable option.

A Cloud Computing provider should have a clearly defined Business Continuity plan. This should be made available to their clients and the guarantees that this offer should be included in the contract.

7. What are the benefits of adopting Cloud Computing?

While many of the arguments for adopting Cloud Computing are compelling for businesses no matter what the economic climate, the challenging market conditions we are experiencing make the adoption of Cloud Computing all the more attractive.

The key benefits of adopting Cloud Computing are:

Freedom

Value

Security

Salability

Simplicity

7.1 Freedom

Much is made of the freedom that comes with Cloud Computing. Many of the applications that are delivered in the SaaS model rely heavily on the message that they can be used across many devices from many locations. The success of the most popular SaaS application, Hosted Exchange email, has been built upon the freedom message. But freedom is not only about the ability to take location out of the equation. It is also freedom from many of the 'lights on' chores that an IT department have to undertake every day.

The need for patching of servers for security across a company's server farm is removed. Back up of critical data is handled as standard by the Cloud Provider and removes the risk for internal human error. A simple Cloud-based anti-virus and anti-spam solution can block potentially harmful traffic to your company's email servers. Maintenance of the hosting environment is no longer needed as this is off site with the Cloud Computing provider. Providing end-user support around the clock can be handed off to the Cloud Computing provider so if you have global user base or just executives who travel you can remove this burden from your own team.

7.2 Value

The value offered by Cloud Computing is very clear to see. The removal of capital expenditure is the most obvious and is always cited as one of the main benefits of Cloud Computing and in current market conditions this alone can create a very compelling case for adoption of Cloud Computing. It is important to understand the other elements of Cloud Computing that can bring value to your business.

Fixed, predictable costs that remain within budget have traditionally been a challenge when delivering any project; invariably there is a change of requirement or an unforeseen incident that impacts on the original budgeted costs. Moving to a pay for what you use, as you use it model allows you to fully predict costs. This cost can then be charged back into the business as appropriate. You can remove the cost of shelfware when a project gets put on hold or paying for maintenance contracts on services which have long stopped being used within the company.

All budgets within a business are being scrutinised and the IT department is often under more pressure than most to reduce cost. There has been a long trend of the IT department being required to deliver more with less but this is now a necessity. Cloud Computing enables a new way of utilising technology, not just removing capital expenditure and lowering costs but also more flexible, faster deployment cycles and reducing costs.

Traditionally IT departments have simply added additional hardware or hired additional resource as the company has grown and needs have changed. However, this model is no longer acceptable. Even when the pressure is lifted and economic conditions ease companies will be reluctant to return to their easy spending ways.

'If your chosen provider ceases to trade what happens to your data, will the data be returned to you and if so in what format and what time scales?'

Achieve more with less is now the mantra that we have to live our working lives by. Around 65% of a company's IT budget is spent on 'lights on' operations. In some less well run organisations this is over 80%. Removing some of the 'lights on' costs from a business is the first step to reducing long-term costs.

Looking at easy and quick wins can sometimes be as simple as identifying the resource intense essential services you supply to the rest of the company. Email, the essential business tool, is seen as one of the first areas to consider outsourcing to a Cloud Computing provider. Hosted Exchange email providers have been delivering highly stable cloud-based email solutions for businesses for five years. This has spread from SME into the mid market, with Microsoft offering their own direct services.

Hosted CRM, either Microsoft Dynamics or Salesforce.com is often the next service to be put into the cloud. The decision to do this is often made outside of the IT department by the sales and marketing departments and the IT department no longer need to carry the overhead for the hardware, software and support of this business service.

A natural progression from email and CRM is the business desktop. Currently less than 1% is delivered by public or private clouds, however, Gartner predict that 40% will be delivered in this model within the next five years. The UK is leading the world on this. Citrix's Xen desktop is being used widely in private clouds and Nasstar are delivering enterprise grade public cloud Hosted Desktop solutions.

7.3 Security

Earlier in this document there is a section detailing the concerns and considerations that need to be undertaken when selecting a Cloud Computing provider. When accessing this it is an opportune time to look at your internal security.

From the server under a desk through to manned data centres with access control there are usually areas of a company's internal security policies that can be improved with the use of Cloud Computing. The largest security risk is from your own staff, from the prankster looking at a friend's email to a disgruntled employee selling a company's client database through to a malicious external attack gained from lax security policies when a member of staff leaves.

While 47% of companies are reluctant to allow external hosting of their data on the internet many overlook the fact that much of their data is already sitting at the end of an internet connection. While many people are highly skilled in one or more areas of technology often security is overlooked once the basic precautions have been made.

When adopting Cloud Computing you have the opportunity to define policies and define architecture that you feel will give you the required security policies for your company rather than reengineering legacy architecture.

7.4 Scalability

Capacity planning is a key element of IT management's role. Cloud Computing enables you to provision IT in an instant but of course it is not as simple as that. In the traditional model you would access your current capacity within your own data centre facilities. You would assess whether you have enough physical space, power and connectivity and if you fell short on any of these you may have had to look at what can be moved or which legacy systems could be switched off. All of this takes time.

Within a cloud model it is possible to deploy these services very quickly. With a solution such as Amazon Web Services new virtual servers can be deployed in minutes using standard images. For standalone projects or applications this can be ideal, however, there will be limited integration to your existing services and you may be limited to the standard images.

This can be ideal for development projects and you may then go on to use the Cloud Computing platform you have developed for the production service. When you are requested to provide a proof of concept or prototype, Cloud Computing can remove your concerns about the resources you have to support this. The costs are very visible and can be built into the project from day one and billed back to the appropriate department, who can alternatively purchase these directly removing the need for the project to impact on the IT department.

Projects can be rolled out quickly and with very little preplanning a solution can be rolled out across the globe at little more than a flick of a switch. The reality is somewhat more involved but it is a fraction of the planning, logistics and deployment time which has up until now been required.

With many projects not getting further than a trial phase you can simply switch off the services that you have used and stop the costs. If your company has to 'right size' and reduce staff numbers, these users can simply be switched off and reactivated when business picks up.

7.5 Simplicity

Simplicity of the service means that often the people purchasing Cloud Computing have little or no real technical knowledge. This may mean that you will lose some control of IT use within your business. End-user defined technology will already be taking hold within your company. For example the marketing department may be using an external email shot service by-passing the company's email systems completely. The sales team may have moved to using Salesforce.com CRM without involving the IT department in the decision making process.

This is part of the largest change that Cloud Computing may have on you as an individual. The ability for non-technical staff to specify, select and deploy a solution to their business problem without engaging with the internal experts may cause conflict and has the potential to undermine your position. However, fighting against this change may only give the wider perception that you are blocking progress for personal reasons. A far better approach is to embrace this change and offer advice. You may need to think of the wider business impact of such a deployment rather than the granular (such as processing power) but your experience and knowledge will be invaluable to your organisation.

It is a reality that the data centres of the large providers will be vastly superior to your own facilities. The massive economies of scale enjoyed by Amazon, Google or Salesforce.com can be passed on to your business. You may find that geographically diverse data replication falls within your budget or the levels or the resilience you have longed for to provide the guaranteed performance your business dictates is suddenly a real possibility.

Much of the tiresome burden of deploying these systems is removed – you will no longer have to be cabling racks, unpacking boxes and racking servers. While many engineers still enjoy 'getting their hands dirty' it is not good use of their time, it is not unusual to find a highly paid expert in their field crawling under a desk. If this is happening in your team you should review the use of your resource; if you are doing it yourself then you should review how much of your time is spent on making strategic decisions and how much of your time is spent doing work that could be done by someone on a third of your wage.

Bringing about positive change within your business can have a real effect on your company's bottom line and of course boost your own profile.

Introducing solutions that reduce or even completely remove CAPEX will ensure that your department is in line with the company's requirements. Providing quick, scalable deployment may provide your company with the agility needed to gain a competitive advantage.

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8. The Future

If Cloud Computing has grown out of nearly fifty years of thought and development it can hardly be seen as in its infancy, although it could be seen as being in its adolescence with signs of maturity showing in some areas.

The future of Cloud Computing will be shaped by a handful of large providers but these may not be the technology leaders we know today. Some companies such as Microsoft have to protect their revenue from traditional sources and the economics of Cloud Computing may mean that other companies without these concerns can steal a lead. An example of this is Amazon Web Services who have no traditional revenue from this sector and as such can enter the market with low margins with no risk of damaging their existing revenue. Amazon's Jeff Bezos goal is to enter a market and 'suck the air out of the room' and Amazon Web Services may do this with air in the traditional data centre.

However while there may be platforms run by Amazon, Microsoft, Sun, Google or IBM there is a possibility that a new company enters the market and takes the lion's share. We saw this with Microsoft and the office desktop and Google with search. One thing for sure is that Cloud Computing will continue to deliver solutions that challenge the existing ways of doing things.

Adoption of Cloud Computing solutions has been growing month on month for the past three years. Around 30% of all IT will be delivered in this model by 2015, which means there is still space for the traditional model and although it will be some time before Cloud Computing become ubiquitous the change is already happening.

Salesforce.com has now over a billion dollar turn over; daily our families log into Cloud services without realising it – Hotmail, Facebook or Twitter. When developing a new service or planning to deploy a new solution we include a Cloud option in our cost analysis. While it may be too early to embrace the Cloud as the answer for all ills, it certainly now warrants serious consideration for many projects.

Within the UK Taylor Woodrow has moved 1,800 users to Google Apps and the Guardian Media Group has also moved to Google Apps. Microsoft's on-line services suite has been adopted globally by 100,000 GlaxoSmithKline users. Amazon Web Services is used by the BBC and Channel 4. BT have ditched their Seibel-based CRM and are moving to Salesforce.com. The list of companies adopting Cloud Computing solutions grows daily, and is at a point where it will be harder to find a company not using a Cloud Computing service than one who is.

The split in the Cloud can go further than the subsets such as private and public, SaaS, PaaS or IaaS. In the emerging Cloud Computing universe there is the enterprise cloud, where traditional IT services are deployed using Cloud Computing solutions and a new area that is where new applications, hitherto unused within business, are deployed.

The option to move existing infrastructure and systems into the cloud, letting a specialist organisation provide and manage the service has to be a natural progression and is the heart of the old idea of utility computing available at a flick of a switch or the turning on of a tap. Now with the Cloud Computing model not only is the switch to this a practical reality so is the ability to switch back or to another provider.

As Cloud Computing scales and reaches critical mass technical developments for the platform and service stability will have had to increase in line with growth. While many of the services currently available are limited, they are also stretching the technical capabilities of the providers. As time goes on their limitations will decrease and as the technical challenges are overcome the services will become even

more usable. As such their utilisation within businesses will gain a deeper penetration as technical barriers are removed.

It is easy to draw parallels for Cloud Computing with earlier technologies and while these are good illustrations of the change, it is considered by others to be as much of an upheaval as the introduction of the Internet itself. The move to PC from mainframe is being turned round but this time the users can choose how they get their data and a company can choose how this data is delivered. This could lead to a time when the Cloud Computing provider becomes an irrelevance as easy to switch between as an electricity company.

Microsoft believes that two or three large Cloud Computing providers will eventually run the cloud infrastructure. However, this may be a view based on their previous business model. If open standards are adopted to allow interoperability then hundreds, even thousands, of Cloud Computing providers may be very successful, all providing key elements to a larger solution.

Cloud Computing is having a real impact on the way that people adopt computing, the way that they use it and the way that they feel about it.

While many cloud-based systems are a while away from maturity the pace of innovation is making Cloud Computing a viable reality for many companies. For companies not already utilising Cloud Computing solutions within their business now is the time to start investigating how these may help. For companies already benefiting from Cloud Computing in areas of their business this just may be the time to take a bigger step.

'Cloud Computing is having a real impact on the way that people adopt computing, the way that they use it and the way that they feel about it'



Nasstar plc, an AIM-quoted company, makes computing a simple internet subscription service, enabling subscribers of its Hosted Desktop service to do all of their computing in the internet cloud rather than on a local computer. Nasstar's Hosted Desktop (Business Application of the Year – CNET Networks Business Technology Awards) provides subscribers with access to their desktop, files, applications and email over the internet providing a real alternative to traditional on-premise computing.

Nasstar is fast establishing itself as a disruptive force within the IT industry, and customers who have already adopted this service approach to the desktop include Stelios' easyGroup.

www.nasstar.com sets out the key benefits of Nasstar's Software as a Service (SaaS) business model that is truly scalable and works for any size of company.

Nasstar was founded in 1998 by Charles Black. Nasstar plc was admitted to trading on the London Stock Exchange Alternative Investment Market in December 2005 (AIM: NASA).



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