Cloud computing:
resilience is the key to success

white paper

Our 21st century society has become so used to change and new developments that genuinely progressive concepts are initially not recognised by many people. There is then a rush to implementation once the benefits become obvious. Virtualisation is a good example of this, with the technology being around for a decade before its benefits really became understood and appreciated.

We are now on the cusp of a significant evolution in information technology, one which has the potential to completely change how organisational IT is provisioned, managed and protected. Welcome to cloud computing.

This white paper will briefly explain what cloud computing is; will look at the facts which underlie the hyperbole; and will consider both the benefits and challenges that it brings to organisations.

What is cloud computing?

There is some confusion, even amongst IT professionals, about what cloud computing is, but from SunGard Availability Services' point of view it is a network which uses Virtualisation technologies to allow computing applications and data to be flexibly provided from a pool of hardware resources. With cloud computing there is no longer a point-to-point connection between the user and the computing infrastructure. Data and applications are not held on one PC or one server or one network; they are held on a disparate conglomeration of computing resources.

Advantages for businesses include:

■ **Resilience**

One big advantage that all types of cloud computing offer is that, by its nature, cloud computing removes single points of failure. The failure of one node of the system has no impact on Information Availability and does not result in perceivable downtime. Cloud computing provides a highly resilient computing environment. The one major weak point is the network itself. If this fails then cloud computing fails. It is therefore essential that cloud suppliers and private cloud developers consider network topology and ensure that redundancy is built into the entire network.

■ **Scalability**

Cloud computing enables organisations to quickly scale their operations. Provisioning of new resources and software applications can be delivered at a pace that does not hold back the rest of the business. This means that businesses do not need to pay for services which are not being utilised, unlike conventional computing where enough computing resources to meet peak requirements must be pre-purchased.

■ **Flexibility and efficiency**

Cloud computing allows businesses to expand or contract computing power as required and allows 'bursts' of computing power to be utilised on an on-demand basis. Virtualisation has enabled organisations to increase the utilisation of the server environment, cloud computing takes this step further by taking over the management of server utilisation thus reducing 'wasted' compute power. It also allows very effective load balancing. This flexibility helps ensure that resource-intensive processes don't slow down other business processes whilst they are running and that computing services are always at their most cost-effective.

■ **Outsourcing non-core activities**

Cloud computing makes outsourcing of non-core activities relatively simple and very controllable. For many basic business applications outsourcing becomes a simple process, with payment only being made for the computing power or data storage that is used, with no hidden extras and management fees.

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What is cloud computing? continued

Whilst it took virtualisation many years to be widely accepted by businesses, cloud computing will have a much shorter acceptance period. Virtualisation was viewed by many as a 'disruptive' technology. It went against the accepted way of provisioning computer systems and therefore visionaries who saw the advantages had to push against the forces of conservatism. With cloud computing, the battle has partly already been won since as a technology it sits firmly in virtualisation's territory. The business benefits are also much clearer than they were initially with virtualisation. At the end of the day, cloud computing saves businesses money on day to day operations and therefore it is a 'no-brainer' for most organisations to seek to utilise it quickly.

Types of cloud computing

There are effectively two types of cloud: the private cloud, which is contained within the closed infrastructure of one organisation or a group of organisations; and the public cloud which operates via the Internet's IP network and other peer-to-peer IP based networks.

Whether private or public, cloud computing networks have the following three core components:

1. Infrastructure as a Service

Traditionally in the business environment a user's day-to-day computing resources are held in one server at one location. The infrastructure is fixed. With cloud computing, the infrastructure is provided to the user in an 'on-demand manner', hence the term 'Infrastructure as a Service' (IaaS). The 'as a Service' element is driven by the ability to monitor resource utilisation and then bill the customer based on units, be it processor cycles, Mb of bandwidth or throughput, storage read/ writes, etc, consumed. In a private cloud such billing can be part of an internal charging system. Or can simply be a way of monitoring the IT resource usage of different departments and business units. For the public cloud, Infrastructure as a Service allows businesses to easily outsource their computer infrastructure needs to a third party. The usage-based charging systems which will be in place enable the business to maintain tight control of IT spending, whilst avoiding the capital expense of developing its own computing infrastructure.

The user's experience of Infrastructure as a Service is dependent on the investment that has been made in the provider's infrastructure. For public clouds, the Internet is the delivery mechanism and is by its nature very stable and resilient, but the actual infrastructure being provided is situated in either one or multiple data centres and unless these are well powered, well connected, and well managed the benefits of cloud computing will be undermined.

2. Platform as a Service

This component really builds on the previous one but with an additional layer of capability that allows organisations to develop, build, and deploy their own applications to support their own specific business needs. Taking an idea from concept to delivery has, for many organisations, taken months, if not years, to achieve because the development platform and environment has to be built first. Platform as a Service (PaaS) removes this step, providing a cloud computing environment which the software development team can use on a 'pay as you go' basis.

3. Software as a Service

Software as a Service (SaaS) is where a user no longer owns the software that is utilised but instead uses it when required via cloud computing. The software remains the property of the service provider and the user pays for access either by annual subscription or on a pay-per-usage basis. In this way business applications are no longer a capital expenditure item but instead are an operational expenditure cost.

Software as a Service has experienced a huge amount of exposure and investment in the last two years. Both mainstream software vendors and thousands of ISVs (independent software vendors) are repositioning both their products and commercial models to aggressively target this market opportunity.

Some SaaS providers not only provide SaaS but also provide PaaS, therefore allowing users to develop their own software which is then delivered back to the user on a SaaS basis.

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Challenges to be overcome

With any new technology it is important to consider the additional risks that it may bring as well as the benefits. Where cloud computing is concerned these fall in the following key areas:

- **Security**

  Whether organisational data sits in a cloud or in a traditional perimetered system, data will still be vulnerable to hacking and other intrusive attacks. Encryption may go a long way to reducing risk but the information security is only as good as the security policies defined by the business. This means it is just as important to ensure those policies align with your business needs in the cloud, as they would in a physical environment.

- **Internet resilience and bandwidth**

  The public cloud is delivered via the Internet's network and therefore is vulnerable should this become unavailable. The Internet has proved to be highly resilient but local access difficulties have occurred due to physical damage to underwater cables, governments restricting access to it, or local providers experiencing downtime. There is also no experience yet of what impact cloud computing uptake will have on Internet latency. Bandwidth is not unlimited and public cloud computing users may find difficulties with processing speeds at periods of peak demand.

- **Compliance**

  Many countries' data protection laws restrict the way in which data can be stored and mandate the way in which it must be protected. Cloud computing usage, especially where it utilises the public cloud, may place the organisation in non-compliance with data protection laws. It is, therefore, important that this is considered both prior to and during cloud computing implementation.

Key players

There are numerous companies targeting the emerging cloud computing market, but currently the main contenders appear to be:

- **Amazon**

  One of the pioneers of e-commerce, Amazon has introduced 'Web Services'; a basket of services, including the Elastic Compute Cloud (Amazon EC2). This is a web service that provides scaleable computing capacity in the cloud.

- **Google**

  Google's name is synonymous with web-innovation so it is no surprise that it is one of the prime movers in the cloud computing space. Google's main offering is Google Apps, which offers business email, information sharing and security, using the Software as a Service model.

- **Microsoft**

  Microsoft is currently beta testing Azure, its Platform as a Service offering. This is aimed at software developers and general businesses, allowing the building of new applications in the cloud or the use of Windows services running on Microsoft infrastructure.

- **Salesforce.com**

  Salesforce.com offers a variety of cloud-based customer relationship management tools. These are marketed as Sales Cloud, Service Cloud and Custom Cloud. The former being the sales and customer service offerings and the latter allowing the building of custom CRM applications.

- **SunGard Availability Services**

  With the exception of Salesforce.com, the one thing that the above providers have in common is that the services being offered are all designed to either augment existing business processes or replace individual services and are mainly aimed at SMEs. SunGard is taking a different approach and is focusing its cloud offerings at the heart of the enterprise; providing enterprise class cloud infrastructure for private cloud installations. This is linked to a cloud-based data storage facility. These services make the most of SunGard's many investments in resiliency and availability, offering service level agreement-driven peace of mind.

  Another difference is that, while most cloud computing providers leave it to the customer to provision and manage their cloud services, SunGard provides both start-up and ongoing help and support, with all cloud offerings being managed services.

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Recommendations for moving forward with cloud computing

Cloud computing, although still young, has now reached a stage where all organisations should be considering the technology, assessing whether the cost savings, efficiencies and resiliency advantages which can be realised. After going through this process SunGard believes that most organisations will come to the conclusion that the time is now right to start to implement cloud computing. At this stage the following recommendations should be considered:

■ **Learn lessons from early adopters**

Until recently the cloud computing market was in its infancy and early adopters experienced some pain — the so called bleeding edge of any new technology. Someone has to go first and accumulate the experiences that they and others will hopefully learn from. The lessons learned by these early adopters are now been documented by various industry associations and analysts and the resulting reports are worth reading before deciding how and where to implement the technology. There is also a growing cohort of experienced cloud computing consultants who can provide useful independent expert advice.

■ **Keep an eye on emerging standards**

Various standards organisations are working on cloud computing and following the work of such bodies will enable organisations to keep abreast of the latest thinking about cloud computing. SunGard has recently joined the Distributed Management Task Force's Open Cloud Standards Incubator Leadership Board to help in this area. The Open Cloud Standards Incubator Leadership Board aims to address the need for open management standards and interoperability for cloud computing. As a member, SunGard will contribute its expertise in Information Availability and recovery issues; and will contribute to the development of emerging cloud computing standards. Other members of the Open Cloud Standards Incubator Leadership Board include AMD, Cisco, Citrix, EMC, HP, IBM, Intel, Microsoft, Novell, Rackspace, RedHat, Savvis, Sun Microsystems and VMware.

■ **Ensure resilience**

A cloud computing environment is only as good as the resiliency that is built into the system. Whether the organisation is building its own private cloud, or is using the services of an external cloud provider, it is essential that the cloud infrastructure is highly resilient. The cloud infrastructure must be built and delivered with availability at its core. Therefore to be effective the cloud needs multiple highly resilient data centres with very strong network links between them.

Considerations for choosing a cloud computing provider

For many organisations it will prove cost effective to use an external cloud computing provider for at least some applications. The following checklist covers some of the things that an organisation needs to consider before deciding to sign-up with a cloud computing provider:

■ **Does the service you're looking to contract into meet the business availability need?**

What information can the provider give about historical and recent service availability? What investment has the provider made in resilience and high availability?

■ **What service level agreements does the provider offer?**

What compensation is given if the service is lost? Remember this will be a service credit and will not cover consequential loss.

■ **Does the service need to comply with any regulatory obligations?**

Where will your data reside and if, for example, that will be outside of your operational markets, is that acceptable?

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Considerations for choosing a cloud computing provider continued

- **Does the service meet and exceed the requirements of the organisational IT / data security policies?**

  Or does it fall short?

- **Where is the data actually stored and who has access to the data?**

  What happens to the data when it is finished with? How is it archived for regulatory requirements? How can archives be accessed? How is the data finally destroyed?

- **'Cost today' is important but businesses also need to consider 'cost tomorrow' in the decision making process**

  Agility, flexibility, strategy, etc will all have a say in the final decision but you need a baseline to work from. How is the agreement structured? Can the provider change the cost of the service to you? If so, what notice period is there?

Conclusion

Cloud computing is not a revolutionary new idea; instead it is an evolutionary concept which brings together strands from various existing technologies to offer a useful new IT provisioning tool. However, it is absolutely vital that resiliency is at the heart of the cloud computing infrastructure and that investment is made in availability and continuity. Due diligence in this area is important. If the wrong cloud supplier is chosen then IT service continuity will be at risk. Resiliency truly is the key to success in this area.

Cloud computing is now emerging from its early adopter stage and many of the difficult implementation lessons have been learned. The advantages are clear, with the main ones being resiliency, efficiency, scalability, flexibility and easier outsourcing. Cloud computing genuinely does have the potential to radically change the way organisations purchase, manage and provide computing resources to their employees.

Organisations should now be evaluating how and where they can benefit from transferring systems and applications over to a cloud computing environment. Making the most of cloud computing opportunity will enable your IT systems to be more efficient and cost effective; in turn helping to make your business more profitable.

The time to gain competitive advantage from cloud computing is now. Now is the time to establish where your opportunities may lie...