Understand the challenges and benefits to moving to a resilient cloud architecture.

Resiliency is the Key to Success. Our society has become so accustomed to changes and new developments that genuinely progressive concepts are initially not recognized and adopted. Given time and an imperative economic justification, there is then a rush to implementation once the benefits become obvious. Virtualization is a good example of this, with the technology available for a decade before its benefits really became widely understood and appreciated.

We are now in the middle of a significant evolution in information technology, one which has the potential to completely change how organizational IT is provisioned, managed and protected.

Welcome to cloud computing.

This white paper will briefly explain what cloud computing is, review the facts which underlie the hyperbole, and will consider both the benefits and challenges that it brings to organizations.

What is cloud computing?

There is some confusion, even among IT professionals, about the definition of cloud computing. Cloud computing is a general description for anything that delivers hosted services over the Internet. A cloud has a few distinct characteristics that make it different from a traditional hosting model; it is on-demand, and it is elastic allowing users to spin up and spin down computing resources.

Cloud computing enables an IT organization to easily and confidently consume computing resources in a utility-like, on-demand manner. 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; instead, they are held on a disparate conglomeration of computing resources.

The worldwide market forecast for public cloud is estimated at $129 billion, with a five-year compound annual growth rate (CAGR) of 17%.

Advantages for businesses include:

**Core business focus:**
The economy has turned the budget spotlight on prioritizing activities that are aligned with core business needs and drive tangible business value and top-line revenue. This has required IT organizations to reassess the costs of procurement and maintenance of infrastructure and non-core applications. Cloud computing allows companies to better control the capex and opex associated with these non-core activities.

**Scalability:**
Cloud computing enables organizations 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. It also means that businesses do not need to pay for services which are not being utilized, 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 utilized on an on-demand basis. While virtualization has enabled organizations to increase the utilization of the server environment, cloud computing takes this a step further by taking over the management of server utilization, reducing ‘wasted’ computing power. It also allows very effective load balancing. This flexibility helps ensure resource-intensive processes don’t slow down other business processes and computing services are always operating in a least-cost model. Result: IT resources are always optimized to meet current needs.


<table>
<thead>
<tr>
<th>Service Type</th>
<th>Compound Annual Growth Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Software as a Service (SaaS)</strong></td>
<td>19.5%</td>
</tr>
<tr>
<td><strong>Platform as a Service (PaaS)</strong></td>
<td>27.7%</td>
</tr>
<tr>
<td><strong>Infrastructure as a Service (IaaS)</strong></td>
<td>41.3%</td>
</tr>
<tr>
<td><strong>Security Services</strong></td>
<td>22%</td>
</tr>
</tbody>
</table>

compound annual growth rate of cloud-based data services through 2016

**SOFTWARE AS A SERVICE (SaaS)**

**PLATFORM AS A SERVICE (PaaS)**

**INFRASTRUCTURE AS A SERVICE (IaaS)**

**SECURITY SERVICES**
Types of cloud computing

While many definitions and variations of cloud computing exist, the two most common types are: the private cloud, which is contained within the closed infrastructure of one or more organizations, or an external provider; and the public cloud, which operates via the Internet’s IP network without requiring secure access controls. Whether private or public, cloud computing falls within one of the following models:

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,’ or utility, element is driven by the ability to monitor resource utilization and bill the customer based on units, whether processor cycles, megabytes of bandwidth or throughput, storage read/writes, or number of virtual machines consumed. One advantage of cloud offered by third-party service providers is a usage-based charging system which enables businesses to maintain tight control of IT spending.

2. **Platform as a Service**
   This service builds on IaaS with an additional layer of capability that allows organizations to develop, build, and deploy their own applications to support their own specific business needs. Taking an idea from concept to delivery can require months, if not years, for many organizations because the development platform and environment has to be built first. Platform as a Service (PaaS) removes this step, providing a cloud computing environment that the software development team can use. The environment includes readily available templates with operating systems and other software infrastructure components, such as web servers, application servers, and databases in a managed environment. Developers gain access to a fully provisioned environment on short notice, reducing application development time and increasing testing capabilities. Combined with utility billing on a ‘pay as you go’ basis, companies can realize significant cost savings using Platform as a Service.

3. **Software as a Service**
   Software as a Service (SaaS) allows organizations to use a fully managed application, such as CRM, ERP, and e-mail/calendar, over a public or private network, without owning the software or systems required to run it. 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 converted from capital expenses to operational expenses, increasing financial flexibility and return on investment (ROI).

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

With any new technology, it is important to consider the additional risks that it may bring as well as the benefits. **Cloud computing risks involve the following key areas:**

**Security**
Whether organizational 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 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**
When businesses rely on infrastructure and services delivered via the Internet, they are vulnerable to network outages. The Internet has proved to be highly resilient, but international and local access difficulties have occurred due to physical damage to underwater cables, governments restricting access to networks, or local providers experiencing downtime. It is also important to understand the potential impact of Internet latency on cloud computing. Bandwidth is not unlimited and public cloud computing users may experience difficulties with processing speeds during 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 involves an unsecured public cloud, may place the organization in non-compliance with data protection laws. It is, therefore, important to consider compliance prior to and during cloud computing implementation.
Recommendations for moving forward with cloud computing

Cloud computing has now reached a stage where all organizations should be considering the technology to assess the potential cost savings and efficiencies. The following recommendations should be considered as you evaluate implementing cloud computing:

Learn lessons from early adopters
Early adopters of cloud experienced some pain — the so-called bleeding edge of any new technology. The lessons learned have 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 organizations are working on cloud computing and following the work of such bodies will enable organizations to keep abreast of the latest thinking. Several groups are attempting to bring some standardization in public cloud. One of the most known is the Cloud Security Alliance. The CSA doesn’t consider itself to be a standards organization, but it has cloud buyers as well as cloud providers participating to provide a generally accepted control standards for public cloud. The CSA primarily focuses on governance, risk and compliance concerns with a set of components. It has created the Consensus Assessments Initiative Questionnaire (CAIQ), which provides a comprehensive list of questions to address with any service providers. The CSA has been pushing other organizations such as National Institute of Standards and Technology (NIST), the American Institute of Certified Public Accountants (AICPA), and ISO/International Electrotechnical Commission (IEC), to incorporate CSA material into their publications. Other organizations also have influence in the area of public cloud standards including; AICPA, FedRamp, ISO/IEC, and open source communities such as CloudStack, OpenStack and Eucalyptus.

Proceed pragmatically
In a business environment where information availability is critical, it makes sense to proceed using a deliberate and systematic approach to mitigate risk. A test implementation in a system running non-critical processes is a sensible first step, allowing the business to gain hands-on experience of cloud computing usage and provisioning without risking major problems with day-to-day operations. Once the test implementation has been completed and is operating successfully, mission-critical processes and systems can be migrated to a cloud computing environment. The information contained in the organization’s business impact analysis (BIA) is the best starting point for determining which processes are critical and which are non-critical. The BIA essentially provides an audit of all organizational business processes and considers how important each process is and how vulnerable it is to various threats. The outputs from the BIA include a listing of every critical process and how urgently it must be restored following an outage.

Ensure resilience
A cloud computing environment is only as good as the resiliency that is built into the system. Whether the organization 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. To be effective, the cloud needs multiple, highly resilient data centers with very strong network links between them.
Considerations for choosing a cloud computing provider

For many organizations it will prove cost-effective to use an external cloud computing provider for at least some applications. The following checklist covers some of the factors that an organization needs to consider before selecting a cloud computing provider:

**Does the service you’re considering 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 requirements?**
Where will your data reside, and if that will be outside of your operational markets, is that acceptable?

**Does the service meet and exceed the requirements of the organizational IT/data security policies?**
It is important to understand whether the service is offered within a private or public cloud. A private cloud has inherent security advantages because the data are stored within a provider’s closed environment, such as a secure data center.

**Where is the data actually stored and who has access to the data?**
What happens to the data when production tasks are completed? How is it archived for regulatory requirements? How can archives be accessed? How is the data destroyed?

**‘Cost today’ is important but businesses also need to consider ‘cost tomorrow’ in the decision-making process.**
Agility, flexibility, and strategy will all be part of 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, how much notice is required?

**How viable is the service provider?**
It’s important to select a provider with sufficient resources to provide the high levels of availability, resiliency, and security that businesses require. Is cloud computing part of the provider’s core business, or a new venture that could fail if it doesn’t attract and retain sufficient customers? How long has the service provider been in business and what level of experience do they have? Look for a service provider with a broad portfolio of services to address all your IT needs.
Understand the challenges and benefits to moving to a resilient cloud architecture.

Conclusion

Resiliency is the key to success
Cloud computing is not a revolutionary idea; rather it is an evolutionary concept that 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, IT service continuity will be at risk.

Cloud computing is growing in maturity and many of the difficult implementation lessons have been learned. The advantages are clear, with the main ones being efficiency, scalability, flexibility, and easier outsourcing. Cloud computing genuinely does have the potential to radically change the way organizations purchase, manage, and provide computing resources to their employees.

Organizations should now be evaluating how and where they can benefit from transferring systems and applications to a cloud computing environment. Making the most of the cloud computing opportunity will enable your IT systems to be more efficient and cost effective, in turn helping to make your business more profitable. As a service provider with over three decades of experience, Sungard Availability Services currently helps over 8,000 customers meet their data availability and infrastructure needs. We do this by leveraging our experience and proven best practices in data center management, operations, and business continuity and our footprint across the United States and Europe.

Sungard AS’ Enterprise Cloud Services will provide customers the ability to provision and utilize computer backup, networking, and storage, on demand and at scale. Combined with our singular focus on providing customers with availability, security, and recoverability, we continue to assist customers to simplify the way they leverage IT infrastructure to drive business agility and differentiation in a cost-effective manner.

For more information please visit our website at: www.sungardas.com/cloud

Additional reading

Cloud Solution Brief

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