

## **Cloud Computing – Keeping your Feet Securely Grounded When Your Head is in The Cloud**

Henry Ford once said that “the only real security that a man will have in this world is a reserve of knowledge, experience, and ability.”<sup>1</sup> I have heard the term cloud computing for several years around the office, in sound bites from multiple media sources, and from the lips of several of my professors. I have discovered that cloud computing offers an intriguing ability to capture the electronic “reserve of knowledge, experience and ability” of its users in a seemingly simple and user-friendly manner. This paper will address the basics of what cloud computing is, why a professional would find its use desirable, and what security and legal challenges may arise from using a cloud based computer system.

It is difficult to define cloud computing in simple terms. The National Institute of Standards and Technology (“NIST”) defines cloud computing as “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”.<sup>2</sup> An independent European advisory body known as the Article 29 Working Party, explains that “cloud computing consists of a set of technologies and service models that focus on the Internet-based use and delivery of IT applications, processing capability, storage and memory space”.<sup>3</sup> In short, cloud computing offers its users the ability to access and store large amounts of information and programs, or software, in a virtual location accessed via the Worldwide Web or Internet.

---

<sup>1</sup> Henry Ford, Web. Accessed 7/10/13.  
<http://www.quoteopia.com/famous.php?quotesby=henryford>

<sup>2</sup> Mark L. Badger, Timothy Grance, and Jeffrey Voas, *Cloud Computing Synopsis and Recommendations*, published May 29, 2012, NIST SP-800-146, pg 2-1 (2012).

<sup>3</sup> Article 29 Data Protection Working Party, *Opinion 05/2012 on Cloud Computing*, July 1, 2012.

The versatility, as well as the low cost of administration, for the three main service models available in the Cloud makes it adaptable, and desirable to a diverse consumer base. The Computer Security Division of the Information Technology Laboratory (“ITL”) for the NIST explain that the first service model is known as Software as a Service cloud, or SaaS. In the SaaS service model the subscriber uses the provider’s applications which run on a cloud infrastructure. And while the consumer does not manage the underlying cloud infrastructure, network servers, operating systems, storage or individual application capabilities, it may be possible for the subscriber to specify application configuration settings.<sup>4</sup> This service model would be attractive to a) a consumer who desires to provide their members or employees with access to typical software applications such as office productivity or email; b) the user who directly uses software applications, whether on their own behalf or that of their organizations; and c) a software application administrators who configure an application for end users. This service model provides the right to use specific applications on demand, and application data management, such as backup and data sharing between consumers.<sup>5</sup>

The second service model is Platform as a Service cloud, or PaaS. This service allows the subscriber to use the clouds infrastructure applications to support subscriber created or acquired programming languages and tools which are supported by the provider. As with the SaaS service model, the consumer does not manage or control the underlying cloud infrastructure, network servers, operating systems, storage or individual application capabilities but maintains control over the “deployed applications”.<sup>6</sup> This second service model would be attractive to a) application developers who design and implement an application’s software; b) application testers, who run applications in various testing environments; c) application deployers, who publish completed (or updated) applications into the cloud, and manage possible conflicts arising from multiple versions of an application; and d) application end users who

---

<sup>4</sup> Shirley Radack, *Cloud Computing: A Review of Features, Benefits, and Risks, and Recommendations for Secure, Efficient Implementations*, published June 2012, No. ITL June 2012, pg 4, available at <http://csrc.nist.gov/publications/PubsITLSB.html>.

<sup>5</sup> Badger, *Cloud Computing Synopsis and Recommendations*, at pg 5-1.

<sup>6</sup> Radack, *Cloud Computing: A Review of Features, Benefits, and Risks, and Recommendations for Secure, Efficient Implementations*.

subscribe to the applications deployed on a PaaS cloud. This service model provides the consumer the use of the PaaS providers tools and execution resources to develop, test, deploy and administer applications.<sup>7</sup>

The final service model is known as Infrastructure as a Service cloud (IaaS). IaaS would be desirable for a System administrator who wants to access virtual computers, network-accessible storage, and network infrastructure components such as firewalls and configuration services.<sup>8</sup> As with SaaS and PaaS services, the IaaS user does not manage or control the underlying cloud infrastructure, network servers, operating systems, storage or individual application capabilities but maintains control over the operating systems, storage, deployed applications, and possibly limited control of select networking components, such as host firewalls.<sup>9</sup>

Because these service models are so versatile and the cost of administering them is so low, the use of cloud computing has become very desirable. Lisa K. Abe-Oldeburg, a leading lawyer in Computer & IT Law and Technology Transactions, states that “staying on top of the ever-changing technology and tools available today can be daunting and give rise to complex legal issues and risks. [But,] done well, cloud computing has the power to transform organizations, giving businesses greater competitive advantage, increasing their bottom line and shareholder value.”<sup>10</sup>

Cloud computing does not come without risk. When deciding which cloud based service model is appropriate for one’s business use, it is essential to be aware of both the legal and security issues which may arise in the Cloud.

---

<sup>7</sup> Badger, *Cloud Computing Synopsis and Recommendations* at pg 6-1.

<sup>8</sup> Badger, *Cloud Computing Synopsis and Recommendations*, at pg 7-1.

<sup>9</sup> Radack, *Cloud Computing: A Review of Features, Benefits, and Risks, and Recommendations for Secure, Efficient Implementations*.

<sup>10</sup> Lisa K. Abe-Oldenburg, *The Legal Issues of Cloud-Based Computing Services*, published April 24, 2013, Association of Corporate Counsel.

These legal issues include four key areas. The first issue is liability. Who will be liable for loss of business if the subscriber's cloud services are disrupted? Will the provider be required to provide military grade protection to the subscriber's data? Generally the service level agreement a subscriber signs will state very clearly that the subscriber indemnifies the vendor from any consequential claims.<sup>11</sup> The second issue is compliance. Will the subscriber or the vendor who is hosting the subscriber's data and services be responsible for compliance with the law? In many cases, it has been upheld that "simply because you are using hosted services, you cannot transfer the responsibility for compliance with the law to the vendor."<sup>12</sup> The third issue is copyright. Who is responsible to ensure that no copyright is violated? Generally this responsibility lies squarely on the subscribers shoulders.<sup>13</sup> Finally it is important to be aware of data protection and portability. Be aware of who will be responsible for data protection as well as the subscribers access to that data should they decide to move their data to another location or vendor. Will the subscribers provider be able to deny them access to certain data or meta data?<sup>14</sup> Gregory Wilshusen ("Wilshushen"), the Director of Information Security Issues for The United States Government Accountability Office ("GAO") identified the need for the provider and the subscriber to agree on terms to transfer or duplicate data.<sup>15</sup>

According to Wilshushen, cloud computing can both increase or decrease the security of information systems. He states that "security benefits include the use of virtualization and automation to expedite the implementation of secure configurations for virtual machine images. . . [and] broad network access and use of Internet-based technologies."<sup>12</sup> Among the security concerns expressed in Wilshushen's report submitted to the GAO were a) the

---

<sup>11</sup> *Legal Issues in Cloud Computing*, published March 28, 2013. GMO Cloud Blog (last visited June 25, 2013, 2:28 PM). <http://us.gmocloud.com/blog/2013/03/28/legal-issues-in-cloud-computing/>

<sup>12</sup> *Id.*

<sup>13</sup> *Id.*

<sup>14</sup> *Id.*

<sup>15</sup> Gregory C. Wilshusen, Director, Information Security Issues, *Additional Guidance Needed to Address Cloud Computing Concerns*, released October 6, 2011, GAO-12-130T, pg 6.

“possibility that ineffective or noncompliant service provider security controls could lead to vulnerabilities affecting the confidentiality, integrity, and availability” of a subscribers information; b) the potential loss of . . . control over information and data turns over its control to the provider of its security controls and practices; and c) potentially inadequate background security investigations for the employees of a service provider may leave the subscriber vulnerable to “malicious insider attacks”.<sup>16</sup>

Cloud computing offers its users the ability to electronically preserve “real security” as described by Henry Ford. As an informed consumer, the choices regarding the inherent security risks and benefits to using cloud computing for your business lies in your hands. As Lisa Abe-Oldeburg stated “done well, cloud computing has the power to transform organizations, giving businesses greater competitive advantage, increasing their bottom line and shareholder value.”<sup>17</sup>

---

<sup>16</sup> See *id.*

<sup>17</sup> Lisa K. Abe-Oldenburg, *The Legal Issues of Cloud-Based Computing Services*.