
Cloud Computing: Should I Stay or Should I Cloud?

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Abstract

Cloud-based computing continues to make waves in the areas of customer relationship management and enterprise resource planning. And yet, relying on an external vendor to supply mission critical software as a service and warehouse vast amounts of sensitive information is still daunting for many businesses to seriously consider. This paper discusses the advantages and drawbacks of cloud-based enterprise applications software as compared to traditional in-house installed and hosted infrastructure. Topics compared include total cost of ownership, implementation, usability, customization and security. The goal of this paper is to explore further the various issues that businesses must consider when moving to the cloud. Is it really worth it? What key issues should management consider before upgrading or implementing cloud-based enterprise applications?

Keywords: cloud computing, customer relationship management, enterprise resource planning, and total cost of ownership

1. INTRODUCTION

The term enterprise resource planning (ERP) was first introduced by the Gartner Group in 1990 (Wylie, 1990). ERP systems integrate internal and external information across an

entire organization, embracing finance/accounting, manufacturing, sales and service, and customer relationship management among others. Bidgoli (2004) states that "[t]he purpose of an ERP system is to automate this activity with integrated software applications

with the purpose of facilitating the flow of information between all business functions within the organization and manage the connections to outside stakeholders" (p. 707). These organizational information systems generated tremendous amounts of data and required a lot of computing power. ERP systems that are hosted onsite require a significant initial capital investment in facility space, hardware, software, development, IT personnel and testing to make it effective.

Initially, ERP systems focused on back office solutions and did not come into contact with customers and the public in general. Front office solutions like customer relationship management (CRM) were developed to deal directly with customers and became integrated in the early 2000's with the advent of ERP II (Bond, Genovese, Wood, Zrimsek, Rayner, Miklovic, 2000). ERP II introduced web-based applications to conduct e-commerce and to leverage the information gathered from the data generated from resource optimization and transaction processing. It was designed to reach beyond the corporation and interact with other systems.

A recent development in enterprise systems is the use of cloud computing. New businesses have been created in the provision of enterprise software as a service (SaaS) and data warehousing. This business model has drastically changed the way enterprise systems software for ERP and CRM systems among others are offered (Shein, 2009). Businesses are no longer required to purchase highly customized and expensive software, hardware, facility space and additional IT personnel to manage and maintain the system (Laudon & Laudon, 2012).

The value of utilizing enterprise systems for conducting business in a more effective manner has been proven over the course of the last two decades. Cloud computing has expanded from a \$17.3 billion dollar industry in 2008 to a forecast \$43.2 billion dollars in 2012, \$10 billion of which is expected to be spent on infrastructure services (Johnson, 2010). Worldwide spending on enterprise software totaled \$244.6 billion in 2010 (Morgan, 2011). The issue at hand is whether or not businesses should choose cloud-based enterprise resource planning and customer relationship management applications versus conventional in-house software applications.

2. COMPARISON

Cloud-based enterprise applications have become increasingly popular over the last few years. The cost outlay for cloud-based ERPs is much different than a conventional enterprise application system. With a traditional system there is a large initial outlay of capital to develop and implement the system. This requires software development, purchasing the required hardware and equipment to run the system and store data, as well as the time it takes to train the employees to use the system. The average total cost for a large system implementation based on SAP or Oracle software is over \$12 million. The average implementation cost of enterprise systems for small and mid-sized companies from second tier providers, like Lawson and Epicor, is \$3.5 million (Wailgum, 2009b). After the system is implemented ongoing maintenance fees are minimal, however, large upgrades can be costly.

The cloud-based ERP applications require a more modest capital outlay upfront and eliminate the need for additional hardware, equipment, building space and IT staff to access, process and store data. The initial expense for a cloud-based ERP includes the cost of consulting, training and implementation, which accounts for 35% of the total cost of ownership. The remaining 65% of costs are based on the predictable monthly subscription fees. In contrast, on-premise solutions, require initial capital expenses such as consulting, hardware, training, and infrastructure software that can average up 74% of the total cost of ownership (Aggarwal & McCabe, 2009).

A four year total cost of ownership study of small businesses and mid-market enterprises showed a 50% savings by choosing a cloud-based system over an on-premise system. The study compared the use of NetSuite, a cloud-based provider, and Microsoft's Dynamics GP/CRM on premise software (Aggarwal & McCabe, 2009). Microsoft Dynamics is also known as one of the low cost providers for on-premise ERP & CRM applications. A comprehensive total cost of ownership study conducted by the Aberdeen Group (Jutras, 2007) over a three year period found consistent cost savings for companies that chose to implement a cloud-based solution versus an in-house ERP system. The average total cost of implementing an in-house ERP & CRM solution, after three years, for mid-sized companies ranged from

\$1.08 million to almost \$2 million depending on the number of users (Jutras, 2007).

Small and mid-sized businesses (SMBs) are most well suited to take advantage of cloud-based enterprise applications because they typically do not have the financial resources to absorb the required upfront capital expenditure or the expertise to successfully construct and maintain a comprehensive ERP and CRM system in-house. SMBs typically do not have enough employees using the software to take advantage of the economies of scale that an in-house ERP and CRM solution can provide. Large enterprises simply looking to reduce costs are also candidates likely to adopt cloud-based enterprise applications (Stone & Vance, 2010).

Japanese camera and optics manufacturer, Nikon, has moved its entire CRM system to RightNow, a cloud-based CRM provider located in Bozeman, Montana. The company decided to go with a cloud-based system to merge customer data from 25 different sources and applications into one system in the hopes of eliminating maintenance and administrative costs. The decision to go with the cloud system came when Nikon discovered that it could combine outbound e-mail, contact management and customer records into a single system. The results exceeded their expectations as Nikon received a 3200% return on investment or \$14 million in savings over three years. The CRM system developed a web based FAQ system that reduced incoming calls and email to customer service staff, call response times dropped 50% and incoming email by 70%. (Laudon & Laudon, 2012).

O-So-Pure, a manufacturer of ultraviolet water purification systems, is an example of a mid-sized enterprise that moved their entire ERP system to the cloud using Compiere software hosted on Amazon's EC2 cloud. Compiere's software is open source, making it easier for users to modify. O-So-Pure was attracted to this feature because it allowed software to change in order to meet the company's needs and not the other way around. Scalability was also an attractive feature for the company, all of the applications within the ERP system could be easily broadened at a small additional cost to O-So-Pure (Laudon & Laudon, 2012).

The cloud however will not make financial sense to very large corporations due the significantly larger user base. As the number of users

increases the cost of a traditional in-house ERP system begins to become more cost effective. Aggarwal's and McCabe's (2009) research shows that the total cost of ownership gap between in-house and cloud-based ERP systems decreases from 50% to 35% when the number of users is increased from one hundred to two hundred (Appendix 1). Strategic planning considerations for cloud computing requires management to consider the transaction costs and long-term impact of entering the cloud-based market (Hinchcliffe, 2009). Nearly all of the Fortune 500 companies use in-house based enterprise systems as can be verified by investigating the customer lists of SAP, Oracle and IBM. A survey of 2,413 IT decision makers by Forrester Research shows that only 15% of organizations plan to implement ERP software as a service (SaaS) by the end of 2013 (Williams, 2011).

3. THE CLOUD'S ADVANTAGES

Cloud-based applications offer several significant advantages: elimination of capital costs, faster deployment and productivity, streamlines use and management, increases flexibility and improves customer service. The elimination of capital costs is possible because the business accesses the applications through a web-interface over the internet and does not require the purchase of any additional infrastructure, such as servers, backup, operating systems, databases, facility space, etc. A company can simply plug and play. Choosing a cloud provider allows each business enterprise to take advantage of the economies of scale realized by pooling the resources of the provider and all of its customers (Kelly, 2012).

Cloud-based systems are typically deployed in one third of the time as compared to in-house systems. There is no need to acquire, install and test infrastructure and the applications can be accessed from anywhere, anytime through any device (Aggarwal & McCabe, 2009). Mobile apps are often included in the monthly user fee at no additional charge or for a very small monthly fee. One of the leading cloud-based CRM providers, Salesforce charges five dollars per month for full mobile access (Salesforce, 2012).

Use and management of the system is streamlined because the vendor manages, maintains, and updates the infrastructure and software. Upgrades to newer versions of applications are completed without interruption to normal service. When there are problems with

a cloud-based system, the firm simply needs to notify their provider to address the issue. Having a vendor to manage all of these aspects allows the onsite IT team to focus on high value and strategic initiatives (Wailgum, 2009a).

Cloud-based systems are understood to be much more flexible than in-house systems; services can be expanded or contracted as needs change, and they are typically easier and less expensive to investigate prior to acquiring. Because cloud systems can be accessed from anywhere an internet connection is available they more readily support the mobile portion of a firm's workforce.

Long term costs of cloud-based ERP and CRM systems are easier to forecast than traditional in-house software systems because the majority of the cost is derived from the monthly user fees. Because cloud systems require a much less expensive initial investment, businesses are able to modify the existing system or move to a new service provider to suit its needs much more easily. The initial capital investment for a cloud-based system accounts for only 25% of the total cost, while the initial upfront cost for an on-site solution averages about 65% TCO. The disparity is magnified when it is coupled with the fact that the total cost of a cloud system can be as much as 50% less (Aggarwal & McCabe, 2009).

4. CLOUD CONCERNS

Although there are many very real benefits to going to the cloud, there are some risks and concerns slowing its pace of growth. Access control, data security, and reliability of service are the primary concerns for most managers (Wailgum, 2009a). One of the biggest risks of operating on the cloud is its highly distributed computing grids. Applications are stored in virtual libraries within remote data centers that supply business services and data management for multiple corporate clients. To minimize costs, cloud providers often distribute work to data centers around the world where the work can be most efficiently completed. A company may be unaware of where their data is being stored. Unauthorized activity is very hard to trace because of the highly dispersed nature, however, nearly all cloud providers implement some level of encryption to secure data while being transmitted (Messmer, 2010).

Reliability is a major concern for companies considering a move to cloud-based enterprise

systems. In today's world a firm expects their system to be available and running at all times, and to date cloud providers haven't always been able to deliver that. In January of 2009, Salesforce experienced an outage that locked out nearly one million subscribers for 38 minutes preventing hundreds of millions of transactions. A second example was the inability of Intuit to provide its online network of small business applications for two days following a power outage (Miller, 2010). Cloud computing on a large scale is still in its infancy and has made many companies wary of jumping fully onto the cloud. It is also hard for firms to be comfortable with the thought of running mission critical software in the cloud. What if the provider goes out of business or files for bankruptcy? Will service stop immediately? How will a company continue to operate without critical applications? These are all game changing questions that must be answered by providers. Availability assurances and service level agreements are uncommon in the cloud services industry which has slowed the progress of building trust conducting business with cloud providers (Laudon & Laudon, 2012). There is much concern for data control in regard to cloud services as most service agreements from providers state that the companies are not held liable for data loss, fines, or other legal penalties when companies use their services (Fratto, 2009). If a provider goes out of business how does a company go about getting access to all of their data? Can they get their data? These are questions that go unanswered by many providers' service agreements. No company should sign an agreement with a provider without knowing what will happen to their data if the provider goes out of business or is unable to provide the contracted services. Even if this precaution is taken, it must be known how long it will take for a company to get this critical data into its possession. The company must plan for such an event and take appropriate measures to enable the business to function properly. Likely because it is cost prohibitive as compared to an in-house approach or the probability of a sudden and total failure of a cloud service provider is very low.

5. RECOMMENDATIONS

The recommendations on the use of a cloud-based enterprise system will vary based on the size of the company and whether or not the firm already has a traditional in-house enterprise system in place.

6. CONCLUSION

Small and midsized firms without an on-premise enterprise system will yield a better return on investment (ROI) by adopting a cloud-based system. Aggarwal's and McCabe's (2009) research shows that the total cost of ownership over a four year period for small business will be 50 to 55% less for the cloud-based option. Midsized firms saved 35 to 50% by adopting the cloud over the same four year period (Appendix 1). Small business spending on cloud services increased by 36.2% in 2010 (Laudon & Laudon, 2012) and the compounded annual growth rate for cloud services is expected to be above 20% through 2013 (Technavio, 2012). Assuming the level of service and ability of the application software are comparable between the cloud-based and the in-house enterprise system solutions, the cost savings make it very difficult to select in-house hosting. An extremely compelling reason would have to be present for a firm to choose the more expensive in-house option.

In contrast, for larger corporations with at least a several hundred users and up, the cost comparison is less of a benefit and swings back in favor of on-premise enterprise software. Not only due the size of the workforce, but also because larger corporations tend to have complex and inter-related operations due to multiple business units, multiple agencies, and legacy systems. Additionally, organizations that have operations scattered around the globe, and onsite ERP solution allows for increased customization, maintenance, and updates to existing proprietary in-house developed software. With cloud-based SaaS, customization is typically limited to the vendor. A Forrester survey showed that only 15% of organizations planned to implement cloud-based ERP systems before 2013 and two thirds of those implementations will be used to complement existing on-premise ERP services (Williams, 2011).

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Regardless of the size of the organization, there are several risks management must consider in evaluating a cloud-based solution for their own requirements and vendor capabilities. Customers must give up a level of access control and privacy to the cloud provider, which makes evaluating the service level agreements (SLAs), contract terms, and security controls essential. Management must understand how the cloud vendor stores data, who can access it, and what safeguards are in place to ensure that their data are only accessed by authorized personnel. Reputable, publicly-traded vendors will be able to provide an audit trail on data access (Aggarwal & McCabe, 2009). Contract terms should be viewed in great detail prior to signing any agreements. The term of the commitment must be clear as well as any penalties for early contract termination and the ease and cost associated with modifying the number of users. If the contract is terminated early, a plan and agreement should be in place for the vendor to provide you with all of the firm's data they are warehousing. The best providers generally provide an uptime guarantee of 99.5% or better. If the vendor being evaluated does not, the vendor should be questioned on this aspect. Last, but not least, the vendors disaster recovery and business continuity plans should be evaluated (Laudon & Laudon, 2012).

It is clear that cloud computing and cloud-based enterprise systems will continue to be an increasing part of the business landscape. However, according to the ongoing research, on-premise software systems will continue to be relevant for the foreseeable future, especially for large corporations and those that have yet to trust the security and reliability of the cloud.

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APPENDIX 1

TCO Comparison for 52-users, 100-user, 200-user for NetSuite and Microsoft Dynamics GP/CRM

52 Users	NetSuite					Microsoft Dynamics GP Advanced Management & CRM				
	Year 1	Year 2	Year 3	Year 4	Total Cost 4 Years	Year 1	Year 2	Year 3	Year 4	Total Cost 4 Years
Total Evaluation & Selection	7,388	-	-	-	7,388	8,709	-	-	-	8,709
Total IT Infrastructure	-	-	-	-	-	139,739	87,740	87,740	87,740	402,958
Total Application Software	67,764	67,764	67,764	67,764	271,056	158,681	15,998	25,683	25,683	226,044
Total Applications Implementation & support	69,797	15,586	15,586	15,586	116,554	155,524	24,399	24,399	24,399	228,721
Total User Training	10,165	3,388	3,388	3,388	20,329	21,402	7,134	7,134	7,134	42,805
Total Costs	155,114	86,738	86,738	86,738	415,327	484,055	135,270	144,956	144,956	909,236
Total Costs NPV (@7.5%)	155,114	80,686	75,057	69,821	380,678	484,055	125,833	125,435	116,684	852,006
Cumulative TCO NPV	\$ 155,114	\$ 235,800	\$ 310,857	\$ 380,678	\$ -	\$ 484,055	\$ 609,888	\$ 735,322	\$ 852,006	\$ -

100 Users	NetSuite					Microsoft Dynamics GP Advanced Management				
	Year 1	Year 2	Year 3	Year 4	Total Cost 4 Years	Year 1	Year 2	Year 3	Year 4	Total Cost 4 Years
Total Evaluation & Selection	10,239	-	-	-	10,239	12,013	-	-	-	12,013
Total IT Infrastructure	-	-	-	-	-	231,038	135,181	135,181	135,181	636,583
Total Application Software	124,788	124,788	124,788	124,788	499,152	268,473	25,664	43,706	43,706	381,547
Total Applications Implementation & support	128,532	28,701	28,701	28,701	214,635	264,662	41,520	41,520	41,520	389,223
Total User Training	18,718	6,239	6,239	6,239	37,436	36,421	12,140	12,140	12,140	72,843
Total Costs	282,277	159,729	159,729	159,729	761,463	812,607	214,506	232,548	232,548	1,492,208
Total Costs NPV (@7.5%)	282,277	148,585	138,218	128,575	697,656	812,607	199,540	201,231	187,192	1,400,570
Cumulative TCO NPV	\$ 282,277	\$ 430,862	\$ 569,080	\$ 697,656	\$ -	\$ 812,607	\$ 1,012,147	\$ 1,213,378	\$ 1,400,570	\$ -

200 Users	NetSuite					Microsoft Dynamics GP Advanced Management				
	Year 1	Year 2	Year 3	Year 4	Total Cost 4 Years	Year 1	Year 2	Year 3	Year 4	Total Cost 4 Years
Total Evaluation & Selection	16,179	-	-	-	16,179	16,444	-	-	-	16,444
Total IT Infrastructure	-	-	-	-	-	296,338	176,063	176,063	176,063	824,528
Total Application Software	243,588	243,588	243,588	243,588	974,352	407,942	30,844	67,878	67,878	574,541
Total Applications Implementation & support	250,896	56,025	56,025	56,025	418,971	392,182	64,484	64,484	64,484	585,633
Total User Training	36,538	12,179	12,179	12,179	73,076	56,565	18,855	18,855	18,855	113,129
Total Costs	547,201	311,793	311,793	311,793	1,482,579	1,169,471	290,246	327,280	327,280	2,114,276
Total Costs NPV (@7.5%)	547,201	290,040	269,804	250,981	1,358,026	1,169,471	269,996	283,206	263,447	1,986,120
Cumulative TCO NPV	\$ 547,201	\$ 837,241	\$ 1,107,045	\$ 1,358,026	\$ -	\$ 1,169,471	\$ 1,439,467	\$ 1,722,673	\$ 1,986,120	\$ -

Source: Hurwitz & Associates