Business Impacts of Cloud Computing

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Introduction

It has become apparent in recent years that a scalable, cost-effective and easy-entry solution like Cloud Computing is needed. Cloud computing helps businesses of all sizes transform their operations and technology by establishing a flexible, adaptable IT environment to quickly meet changing requirements. The need to accomplish more with less is at the financial core of every medium sized business, and the Cloud’s on-demand nature makes it the perfect IT resource for organizations that need to operate within a tight budget but also need to expand their capacity as their business grows [2]. The Cloud offers access to data, applications and other resources without the need for on-premise software installation. This is a major convenience when doing work on a portable device like a laptop, tablet PC or smart phone. The devices are not only free from the clutter of numerous installs, but the company’s IT team isn’t bogged down with installing, reinstalling, and troubleshooting numerous devices for each employee [10]. On-demand software usage means on-demand licensing; this result in tremendous cost savings for companies that have for years squandered money on software and licenses that filled a niche role or were not as heavily used as anticipated [11].

Before taking a decision to adopt Cloud services and technologies, the business has to consider different aspects which will have an impact on the company’s organization. In chapter 2 of this paper, the most important points which has to be taken into account when deciding how and whether to move your IT into the Cloud will be listed and analyzed. Many aspects of the cloud computing are worth mentioning in this paper.

Definitions of Cloud Computing

Gartner defines cloud computing as a style of computing in which scalable and elastic IT-enabled capabilities are delivered as a service using Internet technologies.[3]

According to the official NIST definition, "cloud computing is a model for enabling ubiquitous, 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.”[4]

Wikipedia defines Cloud Computing as “the use of computing resources (hardware and software) that are delivered as a service over a network (typically the Internet)".
There are many types of public cloud computing: Infrastructure as a service (IaaS), Platform as a service (PaaS), Software as a service (SaaS), Network as a service (NaaS), Storage as a service (STaaS), Security as a service (SECaaS), Data as a service (DaaS), Desktop as a service (DaaS - see above), Database as a service (DBaaS), Test environment as a service (TEaaS), API as a service (APIaaS), Backend as a service (BaaS), Integrated development environment as a service (IDEaaS), Integration platform as a service (IPaaS) (Wikipedia)

1. Storage-as-a-service
2. Database-as-a-service
3. Information-as-a-service
4. Process-as-a-service
5. Application-as-a-service
6. Platform-as-a-service
7. Integration-as-a-service
8. Security-as-a-service
9. Management/governance-as-a-service
10. Testing-as-a-service
11. Infrastructure-as-a-service (see Figure 2)
One could give numerous examples about companies providing SaaS. Barriers to entry on this level are low, and even small startup companies could enter this market. With PaaS and IaaS, however, the situation is completely different. These markets are practically reserved for business “giants” – large companies that can afford to invest in extremely expensive IT infrastructure enabling PaaS or IaaS.

The most popular IaaS is Amazon. They started as the world’s largest virtual bookstore. Now they utilize the huge IT equipment they purchased for their store as an IaaS, where individual or corporate users can buy virtualized hardware resources. Other noteworthy IaaS offerings are GoGrid, Google Compute Engine, HP Cloud and Rackspace Cloud.

With PaaS, some of the most popular players are: Microsoft Azure ®, Oracle Public Cloud ®, SAP NetWeaver Cloud, Google App Engine, Amazon Elastic Beanstalk, CloudFoundry, Heroku, EngineYard, force.com, and so on.

**Case study: SAP NetWeaver Cloud**

SAP NetWeaver Cloud is SAP’s platform-as-a-service (PaaS) solution for development of on-demand applications. It provides a number of advantages to its users:

- Optimized cost model
- Access to applications from any Internet-connected device, anywhere
- Short development lifecycle of applications and short time-to-market
- Integration with mobile applications
- Integration with existing on-premise solutions
- Transformation of capital costs into operational costs (no need for companies to invest into expensive IT infrastructure)
- 99.9% availability

SAP NetWeaver Cloud allows application developers to leverage a wide-spread community standard for application development, in its latest edition: Java Enterprise Edition 6.0 Web Profile. In this way, application developers can easily and rapidly create new application or port existing Java EE applications to the Cloud. SAP NetWeaver Cloud also provides a set of developer tools for the most popular Java development environment – Eclipse. Using these tools, developers could kick-start developing, testing and deploying their applications on the Cloud.

SAP Net Weaver Cloud provides a set of services that developers can use to provide easily complex functionality to users, most notably:

- Connectivity Service for connectivity with on-premise systems. It allows easy integration of legacy on-premise systems by exposing data to the Cloud in a secure and controllable way
- Identity Service for managing users, groups, roles and permissions, and support for identity federation
- Persistence Service, coming in three flavors: relational, non-relational (also known as Document Service) and in-memory (leveraging SAP HANA)

From purely business perspective, a key advantage of the platform is the option to integrate your application in SAP’s online app store, thus leveraging SAP’s commercial infrastructure and reaching out to an already build large customer base.

Besides its commercial program for customers and partners, SAP NetWeaver Cloud comes with a free perpetual developer license, to anyone willing to try it out.

SAP NetWeaver Cloud also comes with community support, forums, blogs and articles, accessible to both paying customers and trial users.

Comparing SAP Net Weaver Cloud to other PaaS offerings, key differentiators are

- It is targeted to and supports enterprise-class applications
- It supports out-of-the-box a standard, powerful and popular programming model such as Java EE
- It allows easy extension of on-premise software to the Cloud (via the Connectivity service), and to mobile devices
- It provides integration with SAP’s commercialization infrastructure
Advantages of Cloud Computing

One of the greatest benefits from the adoption of the cloud computing model is the cost optimization. There are four distinct mechanisms through which this cost optimization is achieved: [12]

• By lowering the opportunity cost of running technology
• By allowing for a shift from capital expenditure to operating expenditure
• By lowering the total cost of ownership (TCO) of technology
• By giving organizations the ability to add business value by renewed focus on core activities

Obviously, this benefits small firms at initial stages or large firms associating with new IT-related projects. There are several aspects to cover. First, according to the fact that the cloud services are usage-based or pay-as-you-go pricing, both small and large enterprises can initially adjust the usage and cost of their IT-related businesses in an efficient way. This idea is similar to the pricing of public utility such as water, electricity, and gas in which the user only pays for the usage and there is no need for investment in the infrastructure or specific equipment, which may account for a lot of money. Most of the time, the cloud services may be utilized at a lower rate in the beginning and at either higher or lower rate according to the demand. This happens when the business has become standardized or the cloud services have been widely accepted for more business activities and become highly reliable.

Therefore, the firm going into the cloud can experience the cost reduction at the beginning and the flexibility of cost management at a later time in its IT-related activities. Second, the preceding usage-based pricing feature of the cloud computing model gives rise to the conversion of capital expenditure (CapEx) to operational expenditure (OpEx). Indeed, small enterprises with limited investment ability can save a lot of money in the fixed investment of ICT capital such as computing machine by utilizing the cloud services and managing the flexible OpEx. Only a few computers with high-speed internet connection are sufficient to experience the cloud benefit. For example, the firm can use the cloud computing service to accomplish a task taking 10 hours and 5 VMs today and no usage afterwards. The payment to the cloud service provider is calculated from only the 10-hour usage and collected only once until the next usage is generated. The company pays only the usage cost without having to purchase the required potential computers equivalent to 5 VMs and let them go idle after the task is done. Therefore, the company can efficiently manage its OpEx rather than having to stick with the high level of inefficient fixed investment of CapEx. Third, the cost reduction comes from the elimination of high costs of hardware investment and software license fee as well as burden of upgrade and maintenance of the system. Under the cloud computing model, the cloud service provider is the one who is responsible for the burden to ensure customers reliability and stability of the developing computing facilities. The company can witness this direct benefit immediately after the adoption of the cloud computing. In fact, it can direct the investment to the all-in-one computing usage without concerns over issues such as hardware and software associated costs and systems maintenance. A higher number of VMs on the cloud is charged according to the usage, while a similar incident is concerned with the necessary purchase of on-premise computers and the required software such as operating systems, office software, and security packages along with the update. [6]

OpEx brings benefits and is desirable for companies because it gives the flexibility to
terminate costs as soon as certain computing resources are no longer utilized and thus needed. With a capital purchase, the server or software being acquired is fully committed to, and regardless of whether it is being utilized, the ongoing costs, by way of depreciation or financing costs, still need to be borne. [12]

Another economic benefit of the cloud computing model is its special feature of risk sharing. Indeed, nowadays the technology world evolves so fast that it is impossible for someone to catch up and specialize in all aspects of particular technology. The cloud computing model is the solution in which each of the parties involved are experts in their aspect of technology provisioning. Altogether, the whole chain of cloud services can be completed resulting in a variety of services to end-users. For example, the end-users do not have to worry about software update and maintenance because they can transfer this problem to the SaaS provider. In the same manner, the SaaS provider is not subject to the risk of providing sufficient computing power and server maintenance because it can transfer this problem to the IaaS provider. The last party, the IaaS provider, can then be certain about its huge investment in the server infrastructure that it will be utilized as long as the number of SaaS provider is sharply increasing. The risk of utilisation will be shared greatly by the SaaS provider and its services consumed by the end-users. [6]

Regarding Total Cost of Ownership (TCO), with the Cloud, most costs are upfront and easy to calculate. This is due to the fact that Cloud providers give transparent pricing based on different resource usage metrics. Pricing is frequently fixed per unit of time. Customers gain certainty over pricing and are then able to readily calculate costs based on several different usage estimates. [12] The cloud computing’s optimized cost model is in part due to multitenancy - one of its foundation features. With multi-tenancy, a single software instance can serve and be shared by multiple clients. Multi-tenancy helps reduce costs even further by providing sharing of computing resources on application level, in addition to sharing resources on OS level (multi-process and multi-threading) and hardware level (virtualization). Note that multi-tenancy is finer-grained sharing approach than the OS-level ones, and they in turn are finer-grained than virtualization. The combination of the three approaches maximizes sharing and thus resource utilization. This then generates a system of efficient computing resource allocation in the cloud world. [6]

Impact on Businesses

It is expected that by 2020 Cloud Computing will be a 240 billion $ industry. The good news – it is expected that Cloud Computing will help open new workplaces worldwide. All business departments and processes will have to be re-designed to reflect correctly new Cloud paradi. [12]
References and Citation:


