

Chapter: Cloud Computing and The Pricing Strategy for Vendors

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1 Cloud Computing and Virtualization

1.1 Cloud Computing

Cloud Computing has been a dominant IT news topic over the past few years. This term refers to any virtualized resources that are delivered as a service from data centers over the internet and that are accessible from anywhere in the world (Lin, et al., 2009; Armbrust et al., 2008; Buyya et al., 2008; Hayes, 2008; Vouk; 2008). All data and software applications that were originally located on desktops and in corporate server rooms are now being swept up and installed in “the cloud” or online resources.

A cloud is grouped into *Private Cloud* or *Public Cloud* based on the location of the data center where the services are being virtualized, the For private cloud, the data center is built internally behind a firewall and not shared outside the enterprise. Full control is retained by the organization. On the contrary, in public cloud, the service providers manage the infrastructure and offer public customers the ability to deploy and consume services over the Internet (Armbrust et al., 2008).

The cloud-based services are not only restricted to applications, or what is called “Software as a Service”, but could also be the platform and the hardware (infrastructure). For example, Google App Engine offers the users a complete development stack that uses familiar technologies to build and host web-based applications; Amazon Elastic Compute Cloud (EC2) and Amazon Simple Storage Service (S3) provide the users with the ability to resize the capacity likes bandwidth, processorand storage required for running their applications. Here, the users are mostly the software developers who implement their applications for and deploying them in the cloud (Youseff et al., 2008).

From the type of the services and its architectural point of view, Creeger (2009), Lenk et al. (2009), Lin et al., (2009), and Vaquero, et al. (2009) have distinguished three layers of cloud computing: SaaS, PaaS, and IaaS. The illustration of these groups can be found in Figure 1.

1. *Software as a Service (SaaS)*

Since this is the subject of this research, a more detailed explanation about it can be found in other sections in this chapter. Some examples are Google Apps, Microsoft Office Live (office application), Salesforce.com (CRM application, Workday (HRM application), NetSuite (accounting application).

2. *Platform as a Service (PaaS)*

This is the application development platform that enables the runtime environment for cloud applications. The providers supply the users (developers) with a programming-language-level environment with a set of well-defined APIs to facilitate the interaction between the environment and the cloud applications, as well as to

accelerate the deployment and support the scalability needed of those cloud applications (Youseff et al., 2008). In order to enable this environment, the providers must ensure that the operating system and the supported application server stack are installed. These application server stacks might be a software bundled used for languages like Perl, Python or PHP, *Ruby on Rails* for Ruby, and *Tomcat* for Java (Zhen, 2008). Examples of PaaS are *Google App Engine* and *Force.com*. Google App Engine provides a Python and Java runtime environment together with the APIs for applications to interact with Google' cloud environment (Google, 2009). Force.com offers the Apex language that allows the developers to design, along with their applications' logic, page layout, workflow, and customer reports (Salesforce.com, 2008). To have a better visualization, we can think PaaS that runs the software likes MS Visual Studio to compile and to run a web.

Instead of being used to deliver the cloud applications, PaaS can also be used as a way to integrate different SaaS applications (Giurata, 2008).

3. *Infrastructure as a Service (IaaS)*

IaaS makes it easy for the developers to provision resources such as servers, connections, storage, and related tools (firewalls, routers, switches) in order to build a cloud application environment from scratch. It was previously known as Hardware as a Service (HaaS), which was first coined by Carr (2006). IaaS can be seen like having a data-center-in-the-cloud, which underlies the infrastructure of PaaS and SaaS.

Virtualization becomes the enabler technology for IaaS that allows the users unprecedented flexibility in configuring their settings while protecting the physical resources of the providers' data center (Youseff, et al., 2008). Some examples are Amazon Web Services S3 and EC2, Terremark, Flexiscale, and Rackspace hosting. Cisco and Microsoft have also stated that virtualization and automation are the key enabling technologies of cloud computing (Lin et al., 2009; Microsoft, 2009).

1.2 Concept of Virtualization

In the book of "Electronic Commerce: A Managerial Perspective" by Turban et al. (2008), virtualization is defined as a technique for hiding the physical characteristics of computing resources from the way in which other systems, applications, or end users interact with those resources. This physical resources can be memory, storage, processors, operating systems, software, and other IT services. The term "virtualization" was originally coined in the 1960s, which referred to a virtual machine, IBM's VM/370 (Barham et al., 2003; Menascé, 2005). Since then, the virtualization has been matured considerably and applied to all aspects of computing both commercially or in research. The combination of the growing needs and the recent advances in IT architectures and solutions has now brought virtualization to the true commodity level (Vouk, 2008).

In the most commonly used processor architecture for computers, the so-called x86 architecture, a virtualization layer is added between the hardware and the operating system. It allows the user to concurrently run multiple

operating system instances within virtual machines (VMs) on a single computer, dynamically partitioning and sharing the available physical resources. According to a presentation given by Kevin Kettler, the CTO of Dell Inc. and VMware (2009), virtualization can be implemented using either a hosted or hypervisor model. A hosted model installs and runs the virtualization layer as an application on top of an operating system and supports the broadest range of hardware configurations. A good example of this model is Microsoft Virtual PC, which is installed on Windows OS and enables the user to run and/or switch across different operating systems like Linux and Mac OS. On the contrary, the hypervisor (bare-metal) model installs the virtualization layer directly on a clean system, from the hardware resources. This model is more efficient than a hosted model and delivers greater scalability, robustness, and performance. In this model, several virtual machines (VMs) with different operating systems are managed by *virtual machine monitor* (VMM) that runs on the hypervisor and maintains full control of the underlying resources given to the VM like the CPU, memory and I/O devices (Figueiredo et al., 2005; Goldberg, 1974; Stumpf et al., 2007). Examples of software that use this hypervisor model are VMware (Microsoft virtualization product) and Xen (an open source Linux-based product developed by XenSource). More recently, since virtualization involves the creation and management of virtual machines, it has become known as *platform virtualization*, or *server virtualization* as well (Wikipedia, 2009). The hosted and the hypervisor models are illustrated in Figure 2.

1.3 Benefits, Limitations, and Challenges of Virtualization

The existence of virtualization has also caused IT professionals to see virtualization as a way to help their business. Below are several benefits resulted by using virtualization:

- *Better security management*
In virtualization, compartmentalizing the environments with different security requirements for different virtual machines allows the user to select the operating systems and tools that are more appropriate for each environment. For example, the user may want to run the Apache web server on top of a Linux OS and a backend MS SQL server on top of a Windows XP OS, all within the same physical platform. A security attack on one virtual machine does not compromise the others (Menascé, 2005).
- *Enhance the availability of virtual machines*
Virtual machines are completely isolated from other virtual machines. A software failure in a virtual machine, or even worse, when a virtual machine crashes, it does not affect other virtual machines (Menascé, 2005; Truban et al., 2008).
- *The reliability and accuracy of data is guaranteed*
In virtualization, the data and the applications are isolated. The data do not leak across virtual machines, and the applications can only communicate over configured network connections (Truban et al., 2008).
- *Enable greater economies of scale*

Consolidating smaller servers into more powerful servers bring significant cost reduction. In response to the number of servers being used, implementing virtualization can reduce the expenses of the required hardware. For instance, a company with the traditional environment will need three servers to run different operating systems such as Windows, Linux, and Mac. Each server costs \$ 5000. By using virtualization, the presence of a better server with the cost of \$ 8000 is able to run all the operating systems simultaneously. A new virtual machine can also be provisioned as needed without the need for an up-front hardware purchase. The operation costs in terms of personnel, floor space, and software licenses are being reduced (Nastu, 2008; Menascé, 2005; Vmware, 2007; Vouk, 2008; Weiss, 2007; Wikipedia 2009).

- *Provide better resources utilization*

The average utilization of CPU and memory of the different servers in a traditional environment is only between 5 - 10% (VMware, 2007). By using virtualization, these utilization can be accumulated within one single machine. Using virtualization also allows the servers to be consolidated on either scale-up nor scale-out architecture (Strickland, 2009; Truban et al., 2008).

- *Easier management than physical machines*

A complete virtual machine environment is saved as a single configuration file, which makes it easy to control and inspect from outside than a physical machine. The flexible configuration file also eases its backup and copy process. And when it is needed, a virtual machine can effortlessly be relocated from one physical machine to another (migration). Next to that, virtualization allows the organization to provision new virtual machines easily and quickly because of the existence such a template within the virtual machine (CyGem, 2008; Strickland, 2009; Truban et al., 2008; Wikipedia; 2009).

- *Reducing migration risks*

Even when an organization is migrating to a different operating system, it is still possible to continue to run their legacy applications on the old operating system without taking their entire system offline for the amount of time required for that process. This is also known as 'hot migration'. Therefore, the risk including the migration cost can be significantly reduced (CyGem, 2008; Menascé, 2005; Strickland, 2009).

- *Disaster recovery*

Because of the easy relocation, virtual machines can be used in disaster recovery scenarios (CyGem, 2008; Wikipedia, 2009).

- *Support the creation of green environment*

Because of the server consolidation and the more optimized utilization of virtualization, the energy that is needed for running the server can be minimized. It is not only financially attractive, but also a green initiative. (Nastu, 2008; Schultz, 2009; Strickland, 2009).

Although virtualization is a dominant buzzword in the IT industry nowadays, there are still several limitations that also need to be taken into account. Some of these limitations are:

- *Confusion about licensing aspects*

Compared to the classic license approach: *'one license per X'*, where X can be a client or a server or the number of CPUs on a server, the virtualization conveys the licensing into a different situation. For example, when the organization buys a server with two CPUs and running eight virtual environments with Microsoft Windows Server 2003, a question of how many the licenses must be paid can be turmoil for software vendors. With the classical approach, the organization will need to pay only two licenses. In fact, several vendors have redefined their licensing model and turned it to a per CPU virtual environment license. In this case, the number of licenses that must be paid by the organization becomes eight instead of two. In addition, some vendors need to more clearly define what is meant by a CPU (Winter, 2007).

- *Lower performance when it comes to full virtualization*

For servers dedicated to applications with high demands on processing power, virtualization is not a good choice because when the server's processing power cannot meet the application demands, everything will slow down (Strickland, 2009; Winter, 2007).

- *Lacking of professional support*

The fact that many open source virtual machines like XEN are still lacking professional support, regarding the documentation, the deployment, and its utilization - even though big software vendors like Intel and AMD start supporting it - has become an important reason why many organizations do not switch to virtualized servers yet (Winter, 2007).

- *Lack of professional knowledge*

Lack of knowledge and skills of the network administrator have caused the migration process of one physical machine to be in an virtualized environment become difficult to accomplish (Winter, 2007).

- *Too many virtual servers can impact the server's ability to store data*

It is unwise to overload a server by having too many virtual servers on one physical machine. The more virtual machines that are supported by a physical server, the less processing power that is received by each virtual server. In addition, there's a limited amount of disk space on physical servers. Too many virtual servers can also impact the server's ability to store data (Strickland, 2009).

- *Incompatibility issues with different manufactures of processors*

Up till now, the migration of a virtual server from one physical machine to another is only possible when both physical machines use the same manufacturer's processor. If a network uses one server that runs on an Intel processor and another that uses an AMD processor, it's impossible to port a virtual server from one physical machine to the other (Strickland, 2009).

By referring to the aforementioned limitations and issues above, it has now become the challenge of many software vendors to come up with new solutions since these solutions might become their competitive advantage in the market as well. First, the software vendors must provide a clear definition of what a CPU is and ensure that the license is fairly charged to their customers. This is an important issue given that many vendors are still questioning how they should handle this complex licensing. Second, in response to the increased use of virtualization technologies that often involve the migration of virtual servers, it becomes necessary to create an

open standard virtual machines that is compatible with many processors from different manufacturers. Third, besides iteratively improving the technical quality of the products, the vendors should also improve their support services to their customers. It might also be a good approach to provide additional trainings to their customers. According to Kettler (2006), there will also be big opportunities for open source virtual machines in the market. And lastly, the Dell vice president for Enterprise Software and Solutions, Rick Becker has also seen the opportunity to produce and sell kind of 'virtual machine buckets' solution sets. By having these buckets, the customers could receive built-in services when purchasing the servers, rather than hardware vendors injecting those services into the product lifecycle, which typically at much greater costs for both the vendor and the customers (Fulton, 2008).

The recent advances in operating system virtualization and the Internet broadband adoption have made the concept of IaaS and PaaS conceivable. (Youseff et al., 2009). IaaS and PaaS, in turn, provide the foundation for SaaS vendors to deliver their solutions in the market.

2 Pricing Strategy for SaaS vendors

Among the three layers depicted in Figure 1, currently SaaS has the biggest number of vendors and has become the most widely used layer in the market (Pring & Stahlman, 2009). The number of SaaS (Software as a Service) solutions in the market has been rapidly growing in the last few years. There have been several success pioneer SaaS vendors in many different sectors such as *Salesforce* in the CRM sector, *NetSuite* in the Finance sector, and *Workday* in the HRM sector. These big vendors have had good experience of specializing in the kind of software they want to offer, to which markets, and how they are going to sell them. Unfortunately, this is not the case for the small and medium vendors, particularly the startup SaaS vendors. Many of them have emerged and then disappeared again in the market. This is often due to a lack of maturity in their corporate strategy, which covers the financial, business-IT, sales and marketing aspects among others. Of course, there is no single corporate strategy that fits best for all vendors because there are always several external factors that also need to be taken into account.

One of the most important benefits of adopting SaaS software is the availability of *having more flexible payment methods* (Geisman, 2008; Kaplan, 2008; Mahowald, 2009; Merchant & Geisman, 2006; Pring et al., 2007; Rowell, 2009; Sääksjärvi et al., 2005). Customers can be offered the finest payment possibilities while still maximizing the vendors' profits, which is not a trivial task to accomplish. There have been various pricing issues faced by SaaS vendors in the market like slow sales cycles, low win rates, chaotic pricing, and difficulty to enter new market/segment (Jones, 2008; Geisman & Nelson, 2008). Therefore, in order to minimize these issues, the availability and integration of a good pricing strategy as part of the overall corporate strategy for SaaS vendors is essential.

SaaS vendors must establish their pricing strategy before conveying their software solution to the market. They must be able to understand all the potential revenue sources, deployment and distribution costs of their solution, its ability to sell them at prices which will allow for maximum profit, and ensure that the strategy is sustainable over time so that the vendor can continuously achieve its objectives (Kittlaus & Cough, 2009). Hogan and Nagle (2005) also stated that “A comprehensive pricing strategy is comprised of multiple layers creating a foundation for price setting that minimizes erosion and maximizes profits over time”. These multiple layers become the core of our framework.

Up till now, there have not been any frameworks in the SaaS research area that provide the vendors with such a pricing guideline. Hence, we proposed the “*Pricing Strategy Guideline Framework*” (PSGF) as a solution that *provides SaaS vendors with a guideline to ensure that all the fundamental pricing elements are included in their pricing strategy*. This framework is intended for small-to-medium SaaS vendors, particularly the startup vendors that tend to have less experience in pricing their SaaS solutions. The framework has been inspired by the ‘Strategic Pricing Pyramid’ of Hogan and Nagle (2005). This is the best applicable software pricing framework so far (Kittlaus & Clough, 2009). The framework has also made use of other theories such as ‘Five Forces Model’ by Porter (1980; 2001), and ‘Value creation in E-Business’ by Amit & Zott (2001) and several essential SaaS elements from different literatures; and the additional significant inputs from our interviews with nineteen different global SaaS companies. This framework has also been validated already by several business and academic experts. The PSGF framework is shown in Figure 3.

2.1 The Pricing Strategy Guideline Framework

The following sections describe the various layers of our framework, which are: *Value Creation, Price Structure, Price and Value Communication, Price Policy, and Price Level*.

2.1.1 Value Creation

To be able to successfully run its business, every company – including SaaS vendors, in all different sectors must have a solid corporate strategy. A corporate strategy defines the market and business where the company is operating and it manages the array of their business units (Goold & Luchs, 1995). As one of the business units, Sales and Marketing becomes the company’s key role to obtain more customers who are willing to buy their products or services. In other words, these are the customers that would bring them revenues. For SaaS vendors, their revenue is generated by charging the customers for using their solutions. Therefore, it is important that Sales, Marketing, and Pricing are collaborated closely.

Vendors always expect to set prices that can capture the value of their solution and that can also maximize their profits (Hogan & Nagle, 2005). Therefore, it is crucial for the vendors to have a good understanding of how much value their SaaS solution can generate for their customers. And this is indeed not a simple task. The vendor must

be aware of different aspects that influence the value creation itself, both from internal and/or external aspects. The former aspect can be identified from the corporate strategy of the vendors. And for the latter aspect, the vendors must not neglect the willingness of their customers, the existence of alternative solutions, the situation of their competitors, the new entrants and also the power of the providers (Porter, 1980; 2001). We also see that the corporate strategy is interconnected with the five sources on Porter's model. Within the SaaS market, we also notice that *the bargaining power of the provider* becomes less relevant when the vendors operate their software on their own infrastructure or when the providers themselves do not offer additional values compared to their competitors. For example, a provider who also acts as a reseller and integrator has more values compared to a provider that only provides and maintains the infrastructure. In practice, SaaS vendors hardly take into account all five competitive sources; instead they are more likely to focus on several or even only on one source. For example, there is a SaaS vendor - as one of our respondent - that pays attention only to the competitor's price.

The value of SaaS solutions can also be identified from the four key drivers of e-business and the linkages among them: *efficiency, complementarities, lock-in, and novelty* (Amit & Zott, 2001). In the context of SaaS, efficiency may include lowering the transaction costs, streamlining the inventory management, and simplifying and speeding up the transaction processes. Complementarities are present when the SaaS vendors offer a bundle of solutions together. The value of lock-in can be achieved because the vendors have more control over their customers. The customers have no direct access to the physical data and are dependent on the format and the offered data export features. Finally, SaaS can also innovate the ways in which vendors and customers do their business, called novelty. We notice that the *efficiency* and *lock-in* are the most valued drivers applied to SaaS.

Business Case

Regarding the situation of SaaS, a business case could be defined as a financial estimation that compares the associated costs of deploying a SaaS solution to the quantified economic benefits or value to be derived from it within a certain period of time (Kittlaus & Clough, 2009). It might include the cost price, price margin, and Return on Investment (ROI) and some other financial measurements (KPIs) such as the number of new customers that sign up every month. We believe that having a concrete business case becomes essential for SaaS vendors before pricing their solution. However, it is true that the business case does not guarantee that the vendor will achieve exactly the same numbers as what has been estimated, but it will certainly give a better financial control for them.

2.1.2 Price Structure

The next step after defining the value creation and the business case, is deciding the pricing structure of the SaaS solution. It covers how the vendors are going to charge their customers; what kind of metrics they must use – especially when they adapt the usage-based model - and how the metrics and billing processes are going to be

measured and tracked; how the software is distributed to the customers; and finally what kinds of services that they want to provide their customers that also includes the creation of SLA.

Pricing model

Because SaaS is a new hype in the market, people are still confused about the term of pricing and licensing of SaaS. Many consider these two terms to be basically the same. In the case of SaaS, the customers do not buy a license but 'rent' the software. Hence, only the term of pricing is applied. According to many different sources (Choudhary, 2007; Dym, 2009; Pring et al., 2007; Geisman, 2008; Hoogvliet, 2008; Kaplan, 2008; Lassila, 2006; Mahowald, 2009; Merchant & Geisman, 2006; Rowell, 2009; Sääksjärvi et al., 2005) and the result from our interviews, it is true that 'pay-as-you-go' pricing becomes one of the main reasons why many software vendors and customers – especially those in the Small Medium Enterprise (SME) market are moving or adapting the SaaS model. It gives more predictable cash flows for both the software vendors and customers, and offers payment flexibility for the customers. The pricing models that are adopted by SaaS vendors to charge their customers with, are mentioned similarly in different literatures. For example, besides the 'pay-as-you-go' model in which the users need to pay beforehand to use the SaaS solution, Sessions (2006) also introduces 'watch-as-you-go' model. Within this model the users will need to watch the advertisement that the SaaS vendors display in return for using their software. Overall, we see that the pricing of SaaS is shaped from one or a combination of the following three pricing models or charging alternatives as shown in Table 1.

- a. *subscription-based*: customers are charged for the same fixed-price for every certain time of period such monthly, quarterly, or annually for independent usage (Postmus et al., 2008). SoftSummit (2008) predicted that the overall software vendors will continue to offer this subscription model with an estimated growth of approximately 10% by 2010.
- b. *usage-based*: customers are charged based on their usage volume from several measurable metrics. This is the reason why SaaS is also typical with "pay-per-use" basis. 'Price metrics' are variables that drive different prices for a single SaaS solution (Kittlaus & Clough, 2009). The used metrics might diverge for different solutions, e.g. amount of data transferred, the time spent by customers in using the software, number of registered users accessing the software, number of completed transactions while using the solution (Ferrante, 2006; Kittlaus & Clough, 2009). The last two are the most common metrics used in the SaaS world. Nevertheless, there are still several other specific metrics that are also useful for the SaaS vendors, which can be found in (Dunham ,2009).
- c. *advertisement model*: customers pay no costs for using the solution while the vendors earn the revenue from advertisements of third parties that are embedded on their web pages. This model has rarely been applied by SaaS vendors. The best example is the Google or Yahoo search engine and Google Apps which includes Gmail as well (Kittlaus & Clough, 2009, Sessions, 2006).

The most favorable charging alternative in the current SaaS market is the subscription combined with the usage-based (number of users) model (Herbert et al, 2007). This fact is aligned with the work of Sundararajan (2004) that analyzes fixed fee and usage based pricing of information goods and finds that the addition of fixed fee pricing is the optimal solution to maximize the profit. A related study performed by Gurnami and Karlapalem (2001) also shows that when the usage based (pay-per-use) model is applied, it will increase the profit of the software vendor, and when both pay-per-use and the subscription perpetual license are used, the optimal pricing strategies to maximize the vendor's profit will be presented. Our interviews show that almost 70% of the respondents have applied subscription-based model with the combination of number of users as the chosen metric. The remaining respondents are still charging their customers using only fixed fee subscription model. However, it is important to note that it is possible that the SaaS vendors will come up with new charging alternatives in the near future.

To have a better overview of the combination between the subscription-based model and number of users, we give an example of a SaaS solution sold by vendor X. The monthly subscription cost of this solution, which already includes two users by default, is € 32,50. However, vendor X is also offer the possibility of having extra users with the cost of € 5,00 for each. So, when a customer wants to have three extra users to access that SaaS solution, then the total cost that needs to be paid by that specific customer would be € 47,50.

Billing & Metering system

When formulating the pricing strategy, vendors also need to keep in mind the billing and metering mechanism for the usage of their SaaS solutions. This is a vital element to be able to run their business properly.

They must ensure that they have accurately charged the single account of the customers based on the usage amount of the solution, either for current, previous or future transactions. A poor billing and metering system may cause the vendors to lose their customers, as the customers might feel cheated by the vendors. This billing and metering system becomes important for the vendors to track their customers' usage and might also be useful for them to expand the potential of their customers base, which is useful input for their future marketing strategy. Hence, having an accurate metering and billing system that can handle the mechanism and report overall usage is crucial. This system must be integrated with the vendor's solutions to allow the unification of all financial data and system operations (Blokdiijk, 2008; Green et al., 2004). The billing and metering system can be built in-house or outsourced to third parties. The in-house systems tend to provide a better alignment of customer resource usage to billing because of their ability to connect to the SaaS platform at more points and collect more information, but it is a lengthy development project in most cases. Outsourcing allows resources to be redirected to the core platform and provides a quicker time to the market, but reaches fewer points than an in-house system (Chaudhuri, 2008; Progress Software, 2008). Companies such as *LeCayla* (THINKstrategies, 2006), *Vindicia*, *Zuora*, and *eVapt* provide billing and metering services and can be used as an alternative for this outsourcing purpose (Wainewright, 2008).

Software

The choice of how a SaaS solution is being distributed to customers is also an important element to be considered by the vendors. Generally, in the case of SaaS, it can be categorized into three types, which are delivered separately or in combination: suite, module, or trial.

a. Suite (bundled or package)

Bundled software of several solutions provides more value than separated solutions, which makes it more preferable for the customers (Bakos & Brynjolfsson, 1999; Dewan & Freimer, 2003) and brings more chance of increased sale-revenue for the vendors. Software bundling can also be referred to the *complementarities* key driver of value creation by Amit & Zott (2001). Nowadays, bundling seems to be the most popular method for the vendors to sell their software.

b. Module

The separated solutions mentioned above are known as *modules*. Vendor need to think twice before deciding to sell their SaaS solution in separate modules. In most cases, vendors will only sell them in modules when they are assured that their solution has a high-level value and strong competitive advantage. They believe, even though the price of their SaaS solution is relatively more expensive, the customers will still be willing to use the software because they cannot find any better alternatives.

c. Trial

SaaS vendors also offer a no-cost fee for using their solutions. These solutions are usually limited by their features and/or limited by a certain period of time (*trial version*) such as 14 days or 30 days. The goal of offering this free solution is to encourage them to use the paid solution.

In reality, SaaS vendors can employ the combination between 'bundled' and 'module' options. For example, vendor X sells their SaaS solution in three different packages (A, B, and C) and in total, the solution has ten different modules (1, 2, 3...10). Package A contains module 1, 2, 3, 4 while Package B contains module 1, 2, 5, 6, and 9; and Package C contains module 1, 2, 3, ...,7 and 9. Of course, the more value delivered by the modules contained in a package, the more expensive the package would be. Figure 4 provides a better view of this package separation. Vendor X offer freedom for their customers to choose which packages or modules are best suited with their business needs. So, when customers of vendor X need only module 1 and 5 to support their business, they can decide to buy the two modules separately or choose package B only. In most cases, the accumulated cost of the choices becomes the main consideration of the customer's decision. Please note that it is possible that some modules are not included in any packages. For example, in figure 4, when a customer needs package A with the additional of module 8 or 10 since these two modules are not included in any packages. Our interviews showed that 84 % of the respondents offer fixed bundled packages of their SaaS solutions, but only 21% of them also provide the possibility of buying separate modules.

The chosen software packaging type is an important element and must be clearly determined before it can be communicated to the marketing department.

Services

By adopting the SaaS model, the way the SaaS vendors provide their services to the customers can also be improved (Hoogvliet, 2008). These services are mostly included in the fee paid by the users. The purpose of providing these services is to help the users with any problems that may occur when they use a SaaS software. From the study and the information gathered from several respondents, we classify these SaaS services into three types:

a. *Real-time support*

Besides only providing the users with a FAQ, or the general contact details of the vendors such as phone and fax number, email address, or a contact to ask their problems, the vendors can also provide real-time support such as 'live chat'. This live chat, also known as 'chat online', can be built on the vendor's web site or by taking advantage the APIs of online VoIP communication tools like Skype. Intacct, one of the leading SaaS vendors in the accounting field, presents a good example by providing different possibilities to their customers to contact its support desk, either via live chat, email, or phone, taking into account the different time zones (Intacct, 2009).

b. *Training*

In most cases, depending on the supported features of the SaaS solution, the SaaS vendors normally also offer different kinds of trainings for end users, the administrator of the users among others. The purpose of having these trainings is to inform the users about the different features of the software and how they can benefit from these features. The training for the administrator users usually covers more aspects and needs more time to complete when compared to the training for the end users.

c. *Professional services*

For customers who want to get help from the vendors such as consultancy service to optimally use the solution to meet their business requirements or technical assistance to extend the functionalities from the vendors, some SaaS vendors also offer professional services. In most cases, these services will convey additional costs to those customers or they are already included in the software package already. A good example of this service is the Customer Success Manager (CSM) provided by Salesforce.com, which is responsible for analyzing the users' behavior and provide added value to their users by helping them to be more effective and efficient in using the software according to their business needs. CSM people visit and have meetings with their customers on a regular basis.

Service Level Agreements (SLA)

One of the key motivators for moving to SaaS is the reduction of business risk (Tarzey et al., 2007). This is identified by the service level agreement (SLA), which is a contract between a vendor and its users which specifies the level of service that is expected during its period. They can specify bandwidth availability, response

times for routine and ad hoc queries and response time for problem resolution such as network down and machine failure (Hoch et al., 2001). The aforementioned types of services are mostly covered within the SLA as well. SLAs can be very general or extremely detailed, including the steps to take in the event of a failure. For example, if the problem persists after 30 minutes, a supervisor will be notified; and when the problems stays after one hour, the account representative will be contacted.

2.1.3 Price & value communication

When the pricing structure including all its elements has been determined, it becomes the responsibility of the marketing people of SaaS vendors to ensure that their prices will be acceptable to the customers whilst maximizing the profit gained. In order to make the price acceptable, it is important that the vendors are able to clearly inform their customers what the value propositions of their solution are. Basically, a 'value proposition' is a business statement that summarizes why customers should buy the vendor's SaaS solution. When the vendor cannot communicate this value proposition clearly, or when the customers do not completely understand the delivered values of the solution, then the customers tend to think that the price offered by the vendors is too high (Hogan & Nagle, 2005). Hence, price and value have a strong relationship. This is also depicted in the framework above by the arrow that points from the 'value creation' level to the 'price & value communication' level.

From the marketing research, the marketing people must already have an estimation of *how much the customers are willing to pay for such a solution*. This is a simple question, but a difficult and complex one to answer. Furthermore, they also need excellent approaches to convince their customers to buy their solution. The information related to the features of the solution, the supported services, and information regarding the vendor's background are necessary (Chau, 1995). They need to explicitly list all the included features and supported services in the different prices of their SaaS solution. This information is interrelated with some elements of the pricing structure layer as well. For example, the 'pricing model' is directly related to the listed different prices whereas the 'software' element is linked to the features list and the 'services' element is associated to the services list of this third layer. Examples of the software feature, both from the technical and/or non-technical issues are: the software functionalities, the availability of being integrated with existing legacy software, the compatibility and performance issues in different web browsers, the user friendliness, and the popularity of the software itself. Furthermore, the services like the availability of technical support (24/7 or only during working hours), and end user training (direct or via online demos) should be clearly mentioned as well. The different listed prices, features, and services could also be part of the value proposition of the vendors.

In case of SaaS, choosing the right marketing channels become another important element to consider. Of course, the old marketing channels such as brochures, advertisements on conferences or in magazines are still used by several vendors. But, we do not see them to be the best solution anymore. New marketing channels like online advertisements via Google Ads and new real-time promotion are becoming more effective approaches to market the vendors' software. The real-time promotion provides up-to-date information to the users such as the

new prices or features of a SaaS software. Figure 5 presents a screenshot of a real-time promotion for the Enterprise package of Salesforce. This promotion can be updated anytime the vendors desire it. It is possible that the 15% discount will no longer be applied one week later.

For the vendors, it is always important to be honest to their customers about the limitations of their SaaS solution and also for other services that are excluded from the listed prices because this will most definitely affect their reputation (Hoxmeier, 2000). Other additional sources that are necessary for their customers are the references and the past experiences of using that software from other customers. This information is commonly found in a case study provided by the SaaS vendors.

2.1.4 Price Policy

Up until this level, the value propositions, the charging mechanism including the chosen metrics and billing system, and the alignment between prices and value; have been defined. It is at the next level when SaaS vendors need to sell and to close the best deal with their customers. In fact, even though the SaaS vendors have published their price list on their website, the prices can still be altered - especially for customers with a large number of users (for example, 400 users or more). These customers may expect and demand additional benefits from the vendor such as free set-up costs and purchasing discount (cheaper price).

In order to close the sale and get a signed agreement appropriately including those additional benefits, the expertise of sales people of SaaS vendors is required. These are the people who have good knowledge and understanding of what they are selling, to whom they are selling to, and how they will sell it (Aston, 2009). To accomplish their task, they require information from the marketing department as well. This is the reason why a solid relationship between sales and marketing people in an organization is vital. This relationship can also be seen in the framework from the position where the pricing and value communication level is above and directly connected with the pricing policy.

To sell the SaaS solution, the sales people must use the best approach or *sales mechanism* to reach their customers. There could be different approaches for different customers. However, there must be pricing regulation, also known as *pricing policy* from the vendors to control what may and may not be done by their sales people – e.g. a policy of never giving discounts bigger than 30%. This is important since the sales people always have the tendency to give more and more discounts to the customers in order to boost their sales numbers (Hogan & Nagle, 2005).

In reality, the vendors may also create price discrimination for different types of customers, depending on the level of their usage (Postmus et al, 2008) and also duration of the contract.

2.1.5 Price Level

When sales people have reached an agreement with a customer, then the price margin of the SaaS solution of that specific customer can be set and followed by calculating its final unit price. A unit price is basically the sales price of a SaaS solution for a specific customer. For the SaaS vendors who do not give additional benefits at all to their customers, because it is part of their pricing policy for example, the listed prices on their websites are the final unit price and apply to all customers.

Before granting the customer access to their SaaS solution, it is significant for the vendors to clearly outline all information on the contract regarding the prices and any possible additional benefits, the minimum period of the contract and the Service Level Agreements.

CHAPTER SUMMARY

Cloud Computing has been a dominant IT news topic over the past few years. First, this chapter gives a broad overview of its three main layers (SaaS, PaaS, IaaS) and the virtualization techniques as the key enablers of cloud computing. The basic concepts, benefits, limitations, and several issues of virtualization are described in detail. Then, we present our main contribution, the *'Pricing Strategy Guideline Framework'*, which aims to assist the small-to-medium SaaS vendors – particularly the startup vendors that tend to have less experience in pricing their SaaS solutions – by providing them with a guideline to ensure that all the fundamental pricing elements have been included in their pricing strategy. The framework consists of five main layers in which each layer contains several essential pricing elements. These layers are *value creation, price structure, price and value communication, price policy, and price level*. It starts by determining the value proposition of the SaaS solution and followed by creating a business case. Afterwards, the SaaS vendors need to consider whether they are going to sell their solution in bundled packages or not; how they want to charge their customers and in what metrics are charged; how they will incorporate the billing and metering system with their SaaS solution; and also what kind of services they would like to offer to their customers. Then, it becomes the task of marketing people to ensure that the value proposition of their solution is well communicated with their prices in order to prevent the possible unnoticed values from the eyes of their customers. In order to reach their targeted profit, the SaaS vendors must have a pricing policy to control the actions taken by their sales people. When an agreement between the sales people and the customer has been reached, the price margin and final unit price are set. Later on, this final unit price, together with any extra benefits, and SLA should be written clearly on the contract before granting the customer access to their SaaS solution.

REVIEW QUESTIONS

1. Define cloud computing.
2. How are SaaS, PaaS, and IaaS related one another?
3. What is virtualization?

4. How virtualization become the key of cloud computing?
5. Name two common virtualization models.
6. List the benefits offered by virtualization.
7. What are the limitations of virtualization?
8. What are the current issues and challenges of virtualization?
9. What are the common pricing problems faced by SaaS vendors?
10. What is pricing strategy? And why it is important for vendors?
11. What is the objective of the Pricing Strategy Guideline Framework?
12. How can the value of a SaaS solution can be identified?
13. What are the value drivers of a SaaS solution?
14. List the elements that need to be included in a business case.
15. Name the common pricing models of SaaS.
16. List several metrics that are used to price a SaaS solution.
17. Why do SaaS vendors need to have a solid billing and metering systems? And what will be the impact that could be caused by a poor system?
18. How do SaaS vendors usually offer and sell their solutions?
19. List the services that are commonly offered by a SaaS vendor.
20. Describe a Service Level Agreement (SLA).
21. What is pricing policy?
22. Name the fundamental pricing elements that need to be considered by a SaaS vendor to adequately price their solution.

DISCUSSION QUESTIONS

- From the customer's perspective, do you think the new per - CPU virtual environment license that have been applied by several vendors can be considered fair enough and plausible?
- How should we assure the different manufacturers of processor to create open standard virtual machines and still be able to maximize their profit?
- Since the PSGF framework contains the fundamental pricing elements, it opens the door for other researches. For example: research on how to choose the best billing and metering system, on how to perform the methodology of selecting the most profitable metrics of SaaS, and on how to build a good SaaS business case; should be examined in the near future.
- Because the elements of the PSGF framework are fundamental, we believe that our framework might apply not only for SaaS, but also for other Cloud-based services such as PaaS and IaaS. Consequently, PaaS or IaaS vendors will apply the usage-based model with more complex metrics and billing-metering system compared to SaaS vendors. Hence, we think that it would be interesting to further study the difference pricing elements between SaaS and PaaS or IaaS.

LIST OF FIGURES

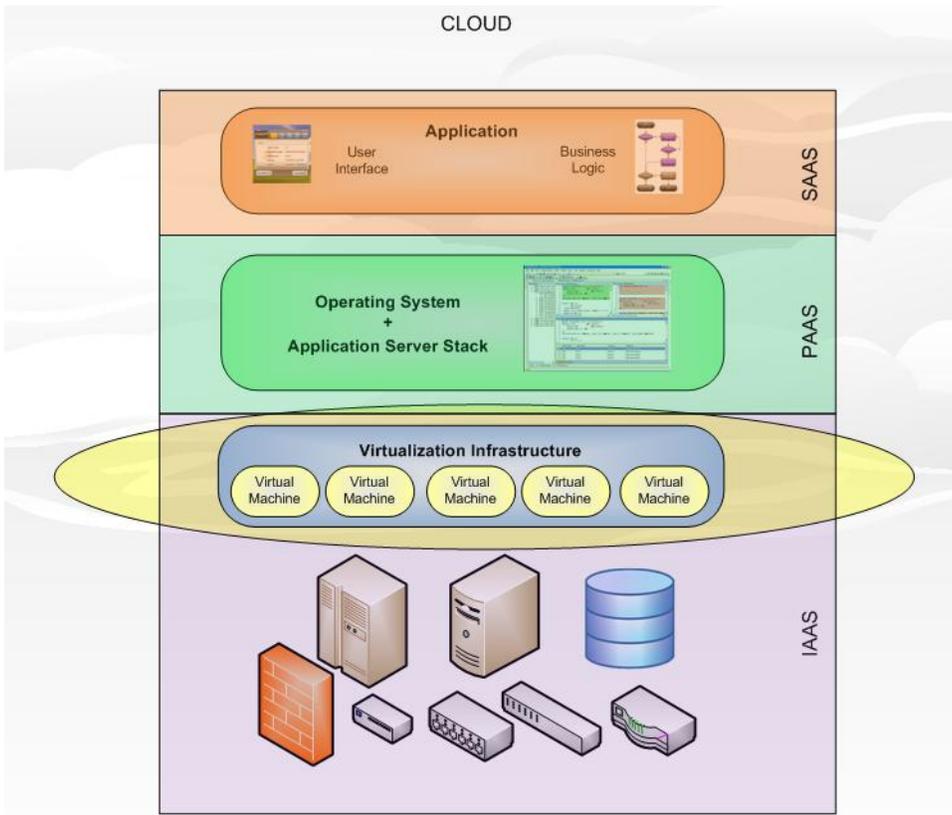


Figure 1 - Ontology diagram of Cloud Computing

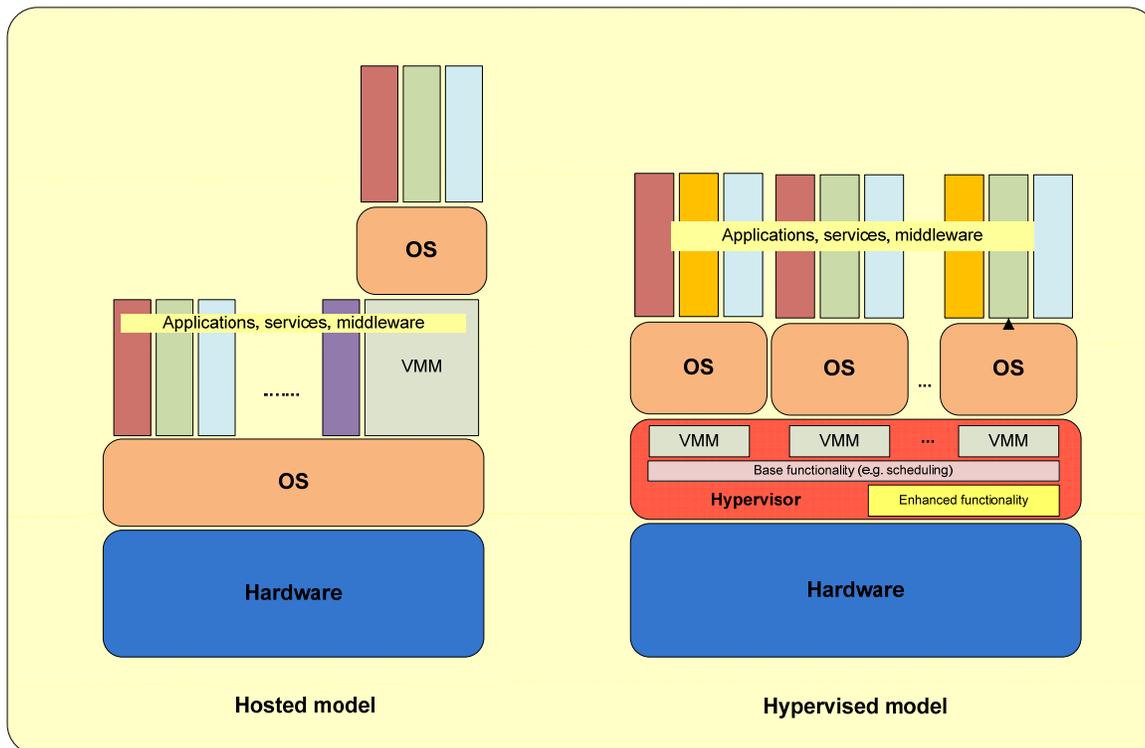
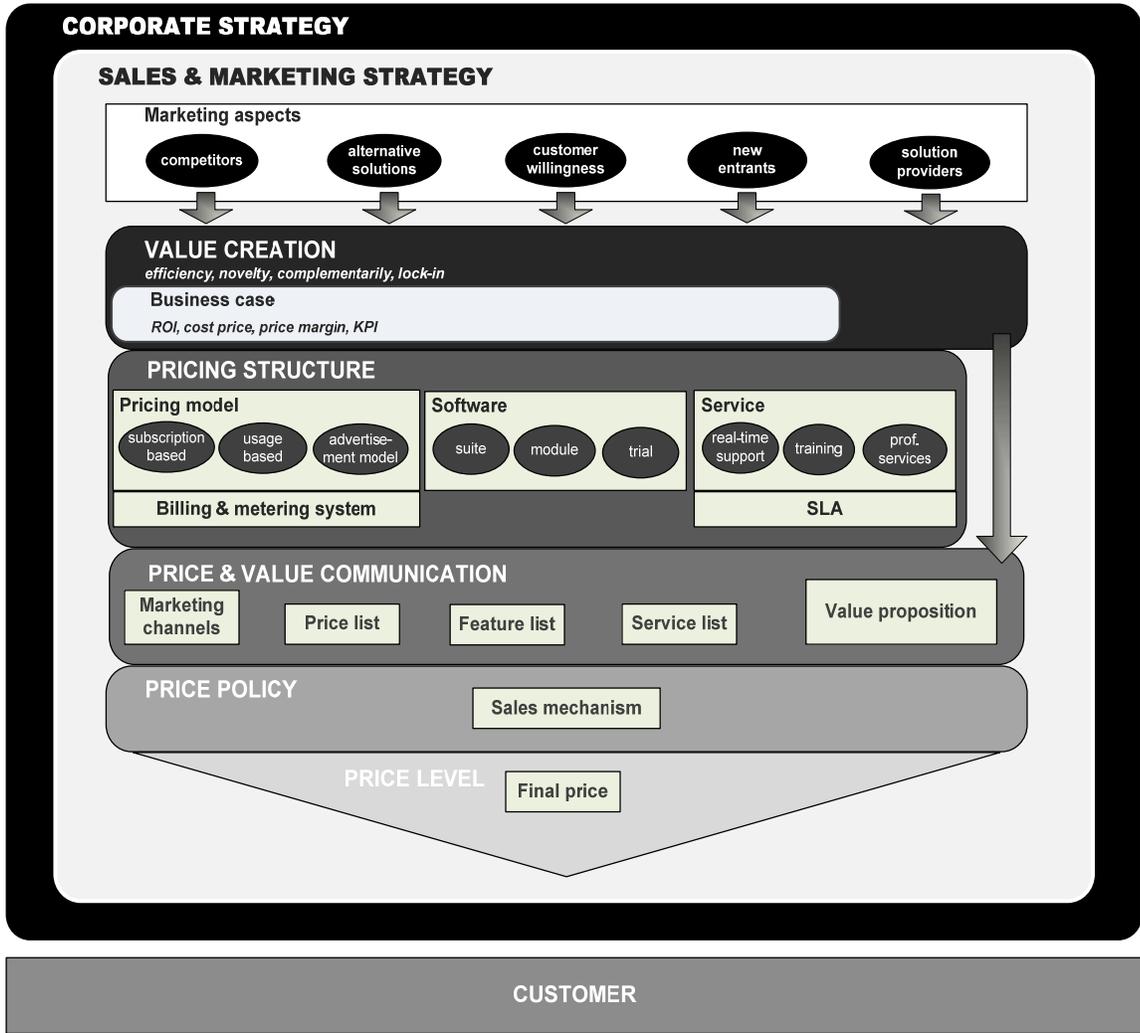


Figure 2 – Hosted model vs. Hypervised model of Virtualization



Legend: → = affects

Figure 3 - The Pricing Strategy Guideline Framework

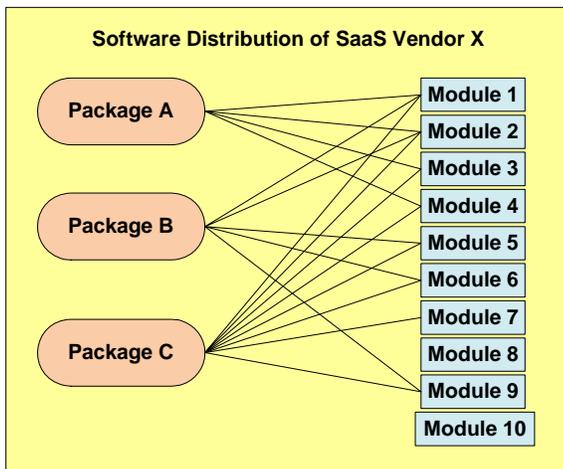


Figure 4 - Example of Software packaging

Choose the edition that's right for your business

Group

Get started with basic sales and marketing

\$9/user/month**

7 day free trial

Basic CRM for 1, 3 or 5 users:

- Contact management
- Leads and opportunities
- Online help and training
- 12x5 phone support *
- Integration with Gmail, Outlook, and Lotus Notes
- 99.9% availability

Hurry! **Offer ends 8/31/09

Professional

See a complete picture of your customer interactions

\$65/user/month

30 day free trial

Everything in Group, PLUS:

- No user limit
- Reports and analytics
- Custom dashboards
- Support case tracking
- Mass email
- Sales forecasting
- Mobile access
- Privacy controls
- Campaign management †

Our Most Popular Edition!
Get 15% off first 10 licenses

Enterprise

Customize and integrate CRM for your unique needs

\$125/user/month

30 day free trial

Everything in Professional, PLUS:

- Workflow and approvals
- API for application integration
- Advanced security
- Content library †
- Offline access
- Sales territory management
- Development sandbox for custom applications

[Full edition comparison chart](#)

Unlimited

Get unlimited power to run CRM and your entire business

\$250/user/month

30 day free trial

Everything in Enterprise, PLUS:

- 24x7 Premier Support
- Dedicated administrator
- Full sandbox environment for testing and training
- Full mobile access
- Unlimited customization
- Unlimited development
- Increased storage limits †

Figure 5 - Overview of a real-time promotion (Salesforce.com, 2009)

LIST OF TABLES

<i>Kaplan (2008)</i>	<i>Kittlaus and Clough (2009)</i>
Pay by user/seat Pay by transaction Pay by service level Pay by month/year	Fixed price per month Usage-based price per month No cost
<i>Sessions (2006)</i>	<i>Tarzey et al. (2007)</i>
Pay-as-you-go Watch-as-you-go	User subscription Pay by usage By data volume Free usage paid for advertising

Table 1 - Different names of SaaS pricing models

USEFUL WEBSITES

The following web sites provide comprehensive information about cloud computing, virtualization, and pricing of SaaS:

<http://aws.amazon.com/s3/>
<http://aws.amazon.com/ec2/>
<http://www.linkedin.com/groups?gid=61513>
<http://www.linkedin.com/groups?gid=44288>
<http://www.microsoft.com/virtualization/products/server/default.msp>
<http://www.saasblogs.com>
<http://www.saasfans.com>
<http://www.salesforce.com>
<http://www.softwarepricing.com>
<http://www.youtube.com/watch?v=kGUPSvswwY0>
<http://www.youtube.com/watch?v=hplXnFUIPmg>
<http://www.youtube.com/watch?v=EbnCUqAL6UM>
<http://www.vmware.com>
<http://www.virtualization.com>
<http://www.xen.org>

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