Business application acquisition: On-premise or SaaS-based solutions?

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Abstract— **The dilemma of migrating business software applications to the cloud is a dominant IT topic among consultants, software managers and executives. It's obvious that the fairly broad interest that cloud computing concentrates is motivated by the quick, painless deployment and maintenance of applications that are now a burden of the provider. Yet one should be able to make a thorough analysis of his business IT problem to decide whether the features and cost of a cloud solution are appropriate and the risks are reasonable and remain under control.**
Keywords: SaaS, TCO, software cost metrics, cloud computing.

I. Introduction

The history of software has shown that frequently enough, significant or even incremental advantages in technology and alterations of business models, cause significant shifts in the way software applications are designed, built and delivered. Cloud computing is such a recent advance that enables the use of software, middleware and infrastructure as services offered by providers [1]. The term cloud computing, which became popular in early 2007, refers to virtual servers, distributed hosting and shared resources available over the Internet, hosted in large data centers [2]. Cloud advocates praise the advantages offered by the cloud, such as decreased costs, the pay-as-you-go pricing models, the quick time to market, and in general, the economy of scale. Currently, the cloud has become our entertainment network (YouTube, Flickr), our social network (Facebook, MySpace), our virtual library (we are 'googling' for everything, such as books, articles, news), our workbench (Basecamp, JayCut), and a development network (Source-Forge.net, Drupal.org).

Developers provide three major cloud system types: software-as-a-service (SaaS), platform-as-a-service (PaaS) and infrastructure-as-a-service (IaaS). In the SaaS type of service, the consumer makes a paid subscription to some software, and all or part of his data and the managing code reside in remote servers. An example of SaaS is Google Docs, which the consumer accesses via a thin client, i.e., a Web browser. In the PaaS type of service, the software developers build code which will be executed on a PaaS provider's platform, instead of the owned platform of an enterprise. Google App Engine is a characteristic example of PaaS. Finally, IaaS delivers virtual machines on-demand to provide scalability to the running software. Amazon's Elastic Compute Cloud (EC2) implements this type of service, for instance.

Currently, the clouds suffer from several weaknesses, with the most significant being security and privacy [3], cloud interoperability (which could support switching from one cloud provider to another, or integration of services offered by different cloud platforms), and availability/viability (in case the cloud provider goes out of business). We do not expect that all these problems will be solved in a way that suits all business needs – at least not very soon, but several efforts toward these directions imply that clouds will earn a significant share in the IT industry [4].

For instance, Salesforce.com created its AppExchange as an open integration platform for other companies that develop products which utilize features of its Customer Relationship Management (CRM) product. Such moves are supporting the creation of a cloud 'ecosystem'. IBM has been working on its Trusted Virtual Data Center (TVDc) project [5] to provide strong isolation and integrity guarantees for customers running their programs on virtual machines that run concurrently on the same physical system. Such efforts are promising a brighter future for cloud computing in the IT industry.

A. Fly to the clouds or not?

As the 'SaaS' cloud services are gradually maturing, the 'large' consumers, i.e., enterprises, organizations must address critical dilemmas, e.g., of whether to buy or lease storage from clouds [6], whether to use or not IaaS services [7], and so on.

This article focuses on a similar question: whether an enterprise should continue operating its own business software on-premises or subscribe to a hosted SaaS service. We deal with SaaS which by definition demands all cloud utilities such as the appropriate platform and infrastructure. We describe the factors affecting such a decision, and offer as example the comparison of costs/benefits of a traditional CRM software versus its SaaS implementation. Such an analysis is useful to both providers and potential customers [8].

II. The dilemma of migrating to a SaaS

Before proceeding in the discussion about the dilemma of whether or not to move to a SaaS-based application, it is clear – at least in the present time – that a mission-critical, or core application of a large or small firm will not migrate to cloud, mainly due to security and privacy issues. For the rest of the applications though, the dilemma is waiting for an answer, actually for a methodological way to reach to an answer. In the sequel we record the main factors affecting such a decision.

The adoption of SaaS-based solutions, and of the cloud in general, is pushed forward due to three main factors [9], namely cost savings, complexity of current IT operations, and 'anxiety' for innovation. SaaS-based applications save customers from huge upfront investments in IT infrastructure; the SaaS provider sets up and maintains the overall infrastructure. Thus, cloud-based software acquisition reduces both capital

and operational costs. IT complexity has increased dramatically as applications become more complex, and changes require significant planning and testing. Companies are gradually facing a difficulty in achieving this goal, since even the smallest changes sometimes involve coordinating process changes across several departments. This costs time, which companies are lacking, especially under the pressure to innovate by launching new products and services in a short time. SaaS-based application acquisition seems appropriate to collectively address these problems (see Figure 1).

But the quick time to bring products to market is just one face of the innovation in software products; the other face is the customizability perspective, i.e., the ability to add new features. Differently from SaaS, the focus of on-premise software is on customization, i.e., adding more and more features, even at the cost of increasing total cost of ownership. SaaS takes the opposite direction, i.e., reducing total cost of ownership but providing less 'elasticity' in the offered software, since such elasticity would increase the maintenance cost as well. Figure 1 presents a qualitative comparison of the priorities of the two alternatives.
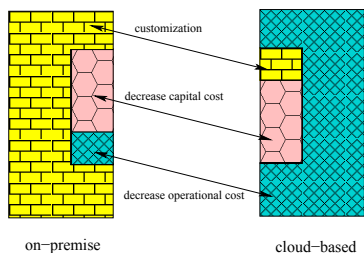

Fig. 1.   Qualitative comparison of software acquisition approaches.

Additionally, the adoption of a SaaS solution needs also to consider the pricing model, and the Service-Level Agreement (SLA), which are contractual promises of certain levels of reliability. For instance, how much of the time the server, platform, application will be available, what will be the 'download' time of the application, and the respective compensation. Even though the cloud is able to provide better control of response times by traffic shaping, the bandwidth inevitably decreases as the user and the computing source become farther apart, which, for some applications such as gaming, makes the browser paradigm to pale by comparison to a traditional thick client solution. Moreover, issues such as data loss pertain to the adoption of a cloud-based solution. The usual assumption in IT is that in spite of the data protection scheme and the topology, the data can only be protected if they get transported out of the primary data center prior to a disaster. A cloud provider has the option to transmit the data from the primary site to remote (secondary) sites using either asynchronous or synchronous replication solutions; both solutions have advantages and limitations presenting tradeoffs between consistency vs. latency vs. bandwidth. This problem can be dealt with modern approaches, such as the *synchronous capabilities over asynchronous infrastructure* offered by Axxana's Phoenix system. Moreover, other issues relevant to data loss due to the operation of virtual machines and non properly isolated domains may cause loss of data. To prevent this, strong authorization and audit, proper encryption practices and key

management, datacenter reliability, and proper data disposal and disaster recovery, will help from data loss or leakage. Table I summarizes the pros and cons of clouds; this table is generic and will be specialized according to the application domain and its specifics (cf. Table III).

Strengths (internal)	Weaknesses (internal)
Small capital expenses (CAPEX)	Latency problems (until next-generation digital transfer tech)
Easy to set up	Reliability (data loss, code reset during operation)
Easy to maintain	No dedicated personnel
Horizontal scalability (number of instances)	Limited Customizability
Vertical scalability (size of the instances)	Limited Configurability
Redundancy in data/service	No revenue by support operations
Opportunities (external)	**Threats (external)**
'Going Green'	Data confidentiality, integrity, availability (CIA)
Elasticity	Difficulty in cloud switching-interoperability
Convert CAPEX to OPEX	Legislation problems (due to cross-country data distribution)
Quick time to markets	No clear downtime agreements or reimbursement policies
Flexible pricing (e.g., pay-per-use)	No guaranteed ROI
Tolerance to revenue shrinking during crisis periods	Compatibility issues

TABLE I

SWOT ANALYSIS OF MIGRATING TO CLOUDS.

A. Major SaaS providers and services

SaaS has generated growing industry attention and customer acceptance, because it offers a simpler method to adopt and administer essential business software applications such as enterprise spend management, social computing, e-commerce, workforce performance management (WPM), customer relationship management (CRM), supply chain management, office applications and so no. Table II gives an overview of several representative major SaaS industry players.

Organization	Service	Billing model
Google	Google Docs	free
Microsoft	Live services	per month or pay-as-you-go
Salesforce	Salesforce CRM	per-login or per-user/per-month
Zoho	CRM	per-user/per-month
OpenID Foundation	OpenID	free service
Rackspace	Cloud Sites	pay-as-you-use
docverse.com	DocVerse	per user and number of docs

TABLE II

SaaS PROVIDERS.

Table II shows that the dominant pricing models are the usage-based and fixed per-user/per-month; as a matter of fact, long-term commitments have started to become prevalent in the cloud market. In the near future other pricing models may emerge for SaaS-based applications, such as the Amazon's Spot Instances, which for the moment is targeting IaaS and PaaS. It is a dynamic pricing model and the underlying idea is that customers get to bid on unused EC2 capacity. Assuming the bid exceeds the 'spot price' assigned by Amazon, customers will have use of the instance for the hour. The drawback is that the processing may be terminated if the bid for next cycle isn't higher than the new spot price.

III. A TYPICAL SaaS BUSINESS APPLICATION - WHAT DOES IT ACTUALLY COST?

A. SaaS, in-house and IaaS costs

The decision model presented in this section calculates the comparative costs from SaaS subscription versus in-house deployment [10] versus a combined approach. The former one represents the solution of hosting an existing software application to an IaaS provider. Even though in various places of the article we use the term in-house development, we

actually refer both to in-house development and to acquisition of packaged software. Our model accounts for the expected up-front costs which are one time costs and the expected annual divestment and operational costs. It is an effort to build an analysis framework such that presented in [11]. The cost model presented in this section takes into account the literature coming from traditional software cost estimation models [10], information system cost models [12] and also currently used payment methods and SLAs (Service Level Agreements) used by popular providers to bill their services (see Table III). The described cost model aims at helping practitioners to aggregate all relevant economic aspects of an IT deployment model in order to produce early TCO estimates. We should stress that the TCO of using SaaS is highly dependent on the actual SaaS application and platform selected. Different platforms present different levels of customisation challenges/effort required; such an evaluation is out of the scope of the paper. The present model is based on three types of costs:

- C_u : The up-front investment costs of adopting a new software system include all relevant costs associated to software such as software development cost (C_d) or subscription costs (C_{SaaS_sub}), integration and customization costs (C_{in}), professional services (C_{ps}) and user training costs (C_{ut}). Software development costs can be approximated using a standard estimation model or a benchmarking data set like ISBSG (International Standards Benchmarking Group). Subscription costs for SaaS depend on the charge model of the provider. An estimation of C_{SaaS} can be made knowing the number of users and considering an average subscription fee per month. The other types of costs can be assessed estimating the amount of workload and services to be offered or by using rough percentages to derive each type of cost from software development cost C_d. Hardware and middleware costs (C_h) are also accumulated to the first year's expenditures. C_h is calculated by considering the number of servers, desktops, peripherals and the middleware installed on them. For the IaaS solution hardware costs are transformed in IaaS subscription fees (C_{Iaas_sub}). Calculating C_{Iaas} usually demands an initial estimation of the number of instances (servers) required, the middleware installed on them (operating system, database servers, Web servers) and the level of usage and capacity of the instances. Operational costs, involving all expenses mentioned in C_o, are included as well in the calculation of C_u. Analyzing the up-front investment costs for the three solutions normally we can say that for the inhouse and IaaS solution all the relevant costs mentioned earlier are included in the calculations while for the SaaS solution we can exclude hardware C_h and C_{ps}. The following equations can then be used to calculate C_u for SaaS, in-house and IaaS solutions.

$$C_{u(SaaS)} = N \cdot C_{SaaS\_sub} + C_{in} + C_{ut} + C_o \quad (1)$$
$$C_{u(inhouse)} = C_d + C_{ps} + C_{in} + C_{ut} + C_h + C_o \quad (2)$$
$$C_{(IaaS)} = C_d + C_{ps} + C_{in} + C_{ut} + \sum_{i=1}^{S} U_i \cdot F_i + C_o \quad (3)$$

where N is the number of users that subscribe in a SaaS application, S is the number of instances (servers) committed from the IaaS provider, U_i is the level of usage of each instance and F_i are the usage fees that are charged by the IaaS provider according to the capacity and calculation power of the instances.

- C_{ad} : The annual divestment costs include all relevant annual costs necessary to preserve the operation of the existing software system. Such costs involve subscription fees, software and hardware maintenance expenses, customization costs and professional support fees. Annual subscription fees (for SaaS and IaaS) are calculated using the criteria mentioned earlier. Software annual maintenance (C_{a_smain}), customization (C_{a_cust}) and professional support fees (C_{a_ps}) can be estimated empirically, or using benchmarking standards or as rough percentages from the initial software development cost (C_d). Annual professional support fees from the second year of operation may involve consulting, user training and support. Hardware maintenance cost (C_{a_hsmain}), for the in-house solution can be calculated by using a percentage of the initial hardware expenditure. The calculation of annual divestment cost can be performed by the following equations:

$$C_{ad(SaaS)} = N \cdot C_{SaaS\_sub} + C_{a\_ps} + C_{a\_cust} \quad (4)$$
$$C_{ad(inhouse)} = C_{a\_smain} + C_{a\_hmain} + C_{a\_ps} + C_{a\_cust} \quad (5)$$
$$C_{ad(IaaS)} = C_{a\_smain} + C_{a\_ps} + C_{a\_cust} + \quad (6)$$
$$+ \sum_{i=1}^{S} U_i \cdot F_i + C_o \quad (7)$$

- C_o : operational costs may include networking infrastructure (C_{net}), power and electricity costs (C_{pow}) and floor space (C_{floor}). Networking costs depend on the deployment model and may include the costs for Internet connection (C_{ic}), and administrator labor (C_{lab}). C_{pow} and C_{floor} are calculated only for the in-house solution.

$$C_{o(SaaS)} = C_{ic} \quad (8)$$
$$C_{o(inhouse)} = C_{ic} + C_{adm} + C_{pow} + C_{floor} \quad (9)$$
$$C_{o(IaaS)} = C_{ic} \quad (10)$$

When calculating the Total Cost of Ownership (TCO) for a period of n years, a manager could use the simplified formula:

$$TCO = C_u + \sum_{i=2}^{n} (C_{ad} + C_o). \quad (11)$$

The proposed model is evaluated in the *IBM Rational Team Concert* for 50 users. IBM Rational Team Concert is a collaborative software delivery environment. *CloudOne* technology analyses the cost for in-premises and cloud solutions [1] for deploying application development software. We will apply the proposed equations in the particular IT problem and evaluate the results against *CloudOne* TCO analysis. For comparison reasons we will use the same licence fee used in the *CloudOne*

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[1] http://spectrumguard.net/white_papers/wp_components_of_TCO.pdf

analysis, 7400$ per user. At the time of the analysis IBM offered 10 free licences per 50 users.

For an in premise solution we will apply Equations (2), (5) and (9). The development cost in that case is the acquisition cost, $C_d = 7400 \times 40 = 296000$\$$, the professional services cost is derived as a percentage from C_d. The percentages considered in this analysis are in agreement with [13]. Professional services cost are considered about 18% of the initial development cost. $C_{ps} = 18\% \times C_d = 53280$\$$. Integration and customization costs are considered in general about 75% of the initial development. Since in our case, IBM Rational Team Concert supports a variety of different development environments, such as J2EE, .NET, IBM i, System, e.t.c. integration and customization costs are considered to be much lower and calculated as 15% of C_d. $C_{in} = 15\% \times C_d = 44400$\$$. User training costs are considered as 3% of C_d, $C_{ut} = 3\% \times C_d = 8880$\$$. Hardware expenditures involve the acquisition of one server 10000$, the IBM Rational Team server license, 18100$ (http://estore.gemini-systems.com/ibm/software-license/rational-testing-software/software-change-and-configuration-management/rational-team-concert-standard-edition/) $C_h = 28100$\$$. The operational costs involve the Internet connection facilities (C_{ic}), we consider 1 DSL, 24Mbps line per 5 users. The cost of a DSL line is considered approximately 50$ per line/month $\times 50/5 \times 12 \approx 6000$\$$ per year. Also we consider 900$ for routers, hubs e.t.c. Security cost (C_{sec}) is considered to be 800$ for firewalls and antivirus packages. Administration costs C_{adm} are calculated as 1000$ per year per server considering a part time administrator, $C_{adm} = 1000$\$$. Power cost is calculated as $C_{pow} = 30 \times 12 = 360$\$$ per year considering 30$ per server per month. The room required for the server is calculated as $5m^2$ leading to rental expenditures 18$ per m^2 per month, ≈ 1080\$$ per year. Summing up all the costs for the first year of IBM Rational Team Concert operation we come up to the following amount: 440000$. The *CloudOne* TCO analysis come up with the amount of 425005$.

The SaaS deployment costs are calculated considering 559$ per user, per month, with 10 free licenses. The cloud deployment option provides the possibility of recycled licenses (licenses shared between numerous numbers of users that are unlike to simultaneously "log on"). If we make the same assumption as *CloudOne* that one license is shared between two different employees the subscription costs are $C_{SaaS\_sub} = 559 \times (25 - 10\,free) \times 12 = 100620$\$$ per year. The integration cost and the user training cost remain the same as the in-house deployment option $C_{int} = 4400$\$$ and $C_{ut} = 8880$\$$. The operational costs involve the internet connection (6000$) plus routers, switches, hubs (900$), $C_o = 6900$\$$. In total, the costs of SaaS for the first year of operation is 160800$ (CloudOne estimates this cost as 156870$). Therefore, our cost model is in accordance to what the practitioners consider in their analysis.

B. Case study

Description. The case study describes a large industry activating in the area of Petroleum. The subdivision of the company operating in the Balkans consists of 2300 employees mainly technicians and mechanics. Most of the employees work at the refineries. There are 15 different departments, that specialize in different aspects of oil production, for example chemists, quality assurance, e.t.c. The company installed and operated 8 years ago an integrated ERP/CRM system, establishing a contract with *SAP Hellas*.

Demographics. The licences of SAP in the examined company's subdivision are around 200 with the term that each licence (username/password) is shared approximately between three users. For each licence there is a fee of 3000 Euros per user per year. There are four servers dedicated to SAP. There is an IT department in the headquarters of the company consisting of 8 employees maintaining and supporting the SAP system. Two of the aforementioned employees are administrators. Also, each department in Northern Greece has one employee dedicated to customizing SAP for the needs of the particular department, training and supporting users. There is a LAN installation in the company.

Current status and consideration of migrating to the clouds. The company has 23 full-time employees in the Northern subdivision dedicated to the customization and support of the ERP system. The company is considering of adopting a cloud solution due to: a) the (possible) cost reduction, b) the need to remotely access the company data by executives and managers, and c) finally due to the expansion of the company to nearby countries and the subsequent need of integration of data.

SWOT analysis. The appropriateness for the company of a cloud-based solution was investigated in terms of a SWOT analysis (see Table III) concerning that particular company.

Table IV summarizes the monetary costs related to the in-house deployment that currently the company is committed to and also the costs estimated for the two alternative solutions to be considered a) SaaS deployment with a popular SaaS provider b) IaaS deployment in combination with an open source ERP/CRM solution. The on-premises costs are recorded taking into consideration the actual system installation costs of the first year of operation of the currently installed ERP/CRM system. For the annual costs only the annual license fee agreement is considered along with hardware maintenance (on average 5% of the initial hardware expenditure) as the rest of the annual software maintenance, user training and professional support is done internally by the 23 employees dedicated to IT support, customization and administration, 1500 Euros per month per employee). The electricity and floor space costs are calculated for the 4 servers similarly to the IBM RTC example. For the two alternatives considered we attempted to minimize the risk in cost assessment by considering the worst case scenarios. For example, in SaaS solution we assume that C_{ps} is 18% of subscription costs, and integration is 75% of subscription costs. User training – assuming that employees are familiar to the usage of such systems – is relatively low; the same stands for the IaaS solution, as well. For the IaaS solution, we assumed that C_{ps}, and C_{int}, costs remain the same as the on-premises solution. Also, we considered that possible transition to another IT deployment model would require less employees than 23 (17 for SaaS, and 20 for IaaS). For the SaaS solution, we considered

Strengths	Weaknesses	Opportunities	Threats
Increased productivity, ability to remotely work	No platform, knowledge to find/select cloud providers	New business models and improved services [14]	Dependency on external providers
Reduced personnel and resources	Time and cost consuming transition of all critical corporate data	Governmental funding for technology innovators	Global and regional economy recession
Knowledge background and expertise in related technological areas	Difficulty in confronting organizational changes	Mobile devices and computing will be popular	Low security
On-going projects and open source technologies	Difficulty in customization and configuration	High awareness for the green agenda and new approaches to reduce the carbon footprint	No market knowledge and support by EU providers
S+O (Growth Strategy)	W+O (Expansion Strategy)	S+T (Make-up Strategy)	W+T (Defense Strategy)
● Selection of an open source SaaS. Integrations and new functions around ERP should be easily plugged-in, leading to improved services ●The company has the knowledge and the expertise to better exploit possible funding ●The ability to work remotely will exploit all possibilities provided by mobile devices and new IT trends	●No platform, knowledge to find/select cloud providers: Build a formal structure for strategy & decision making. Select the criteria that are important for your new business models enabled by SaaS and pursue them ●Time consuming transition of all critical corporate data, difficulty in confronting organizational changes: establish a safety mechanism, encourage and motivate employees assigned to the task ●Difficulty in customization: Select an ERP relevant to the existing one, check the available automated customization modules offered by the SaaS provider. Another solution is to consider the anticipated open source SaaS (currently being on the way e.g., Apatar.com)	●Dependency on external providers: the company has an experienced IT department and certain customizations can be done internally ●Global and regional recession: personnel and resources costs are estimated to decrease, the CRM is expected to attract more customers ●Low security: There is Knowledge background and expertise to establish a security process internally. Deploy encryption, VLANs, and firewalls ●No market knowledge and support by EU providers (USA cloud providers are more mature), an open SaaS deployment minimizes the problem as only an IaaS provider would be necessary	●Organizational changes can be smoothly enforced by the management. The dependency on external providers and security threats can be minimized by defining a strategic plan to motivate employees for the organizational change. The management has the power to motivate them to participate and contribute to that change (data transfer, security issues, lack of instant support are the issues that need to be confronted by the employees) ●A well established decision model for the selection of the appropriate SaaS provider can help in selecting a cost effective deployment model that will help the company survive from the economic recession

TABLE III

SWOT ANALYSIS FOR CLOUD ADOPTION.

System Installation Costs	in-house solution	SaaS	IaaS (open source)
Software costs	1300000 (C_d)	312000 (C_{SaaS_sub})	
Professional services (C_{ps})	234000	56160	234000
Integration (C_{int})	975000	234312	975000
User training (C_{ut})	39000	10000	10000
Hardware-Middleware (C_h)	40000		3745.44
Operational expenses (C_o)	490760	383000	446000
TOTALS	3078760	995472	1668745.44
Annual Costs			
Subscription free (I-S)aaS	600000	312000 (C_{SaaS_sub})	3745.44
Software maintenance			
Hardware maintenance (C_{a_hsmain})	2000		2000
Professional support fees (C_{a_ps})			
Customization			
TOTALS	602000	312000	5745.44
Operational Expenses			
Administrator/IT staff (C_{adm})	483000	357000	483000
Switches, routers, wireless (C_{sec})	2000	2000	2000
Network infrastr. and Internet (C_{ic})		24000	24000
Power, electricity (C_{electr})	1440		
Floor space (for hardware) (C_{floor})	4320		
TOTALS	490760	383000	446000
Up-front expense	3078760	995472	1668745.44
Recurring annual fees	602000	312000	5745.44
Operational expenses	490760	383000	446000
Total TCO for 1 year	3078760	995472	1668745.44
Total TCO for 5 years	7449800	3775472	3475727.2
Total TCO for 10 years	12913600	7250472	5734454.4

TABLE IV

CALCULATIONS OF COSTS.

assessing costs and collecting metrics can be useful decision supporters. SWOT analysis is an important tool for auditing the overall strategic position of a business and its environment, while TCO analysis can provide monetary assessment of the alternative IT solutions. The present analysis will be extended towards calculating ROI [15].

an average annual subscription fee of 130 Euros per user (Salesforce.com), for 200 users and also Internet connection fees calculated as 1 DSL line every 5 users. Additionally, for the IaaS solution, we consider the deployment of Open Source software, therefore no software acquisition costs are considered, but the rest of software deployment activities are calculated as in the in-house case, apart from user training, while the annual subscription fee to the IaaS involves the usage of 4 servers according the utilization schema proposed by the Amazon monthly calculator[2].

The TCO costs demonstrated in Table IV shows that the SaaS solution is beneficial w.r.t. in-house, but the gain tends to decrease over a ten-years period of time; unlike the difference between IaaS and in-house, which remains practically stable.

IV. WHAT'S AHEAD?

Even if Cloud computing is considered as 'hype', it seems that the Clouds will play a large part in the ICT domain over the next years. The major reasons are the additional capacity needed temporary by some business, the utilization of clouds as 'neutral territory' for joint enterprise operations, the business continuity/disaster recovery, the pursue of a low-cost entry point into ICT and many more. Cloud computing seems an attractive option but still the decision of migrating to the cloud is a tough one as there are many aspects that should be taken into consideration. Defining the business case, valuating,

[2]http://calculator.s3.amazonaws.com/calc5.html

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