Cloud Services for SMEs – Evolution or Revolution?

Cloud Services, i.e. standardised, scalable IT resources and services provided "via the network", are changing the IT landscapes of businesses and enterprises. This article analyses the impact of Cloud Services and shows that the existing ecosystem of IT service providers and their small and medium enterprise customers will change significantly in the next ten years.

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Few technologies have improved productivity, revolutionised production and stream-lined processes more than the Information Technology has. The impressive productivity gains in manufacturing and service industries would hardly have been feasible without IT and IT-driven process automation. Overall, the IT industry has become, in many regards, a substantial driver for efficiency gains and growth of the world economy [2].

It is therefore somewhat surprising that the IT industry itself is not really industrialised. Regarding its procedures, processes and production models, the IT industry is actually at a pre-industrial stage: dedicated, bespoke IT projects still dominate – structured, modular IT portfolios with a common service-oriented architecture are still the exception.

The standardisation and virtualisation of IT resources are promising to change this. So-called Cloud Services, i.e. processing power, data storage and applications provided through private or public networks, empower enterprises to move large parts of their business IT from their premises "into the cloud", offering them efficient, flexible and scalable processing power and functionality on a "per use" cost basis.

This trend will substantially change the traditional ecosystem of IT services providers and especially small and medium enterprises.

The Industrialisation of Information Technology

The predominant production model of the IT industry indeed does not appear to be fully industrialised: despite all attempts to modularise and standardise the process of software development, IT projects often result in individual, bespoke solutions. IT resources, software as well as hardware, are consequently associated to dedicated, logically and physically separated IT islands.

This leads to today's widespread inhomogeneous, inefficiently utilised server parks and separated application environments with complex interdependencies. Maintenance of such divers IT landscapes is becoming increasingly complex and a services-oriented life-cycle management hardly feasible.

The sheer fact that the overwhelming majority of businesses does operate IT systems – even and especially when their core business is not the operation of IT systems, but, for
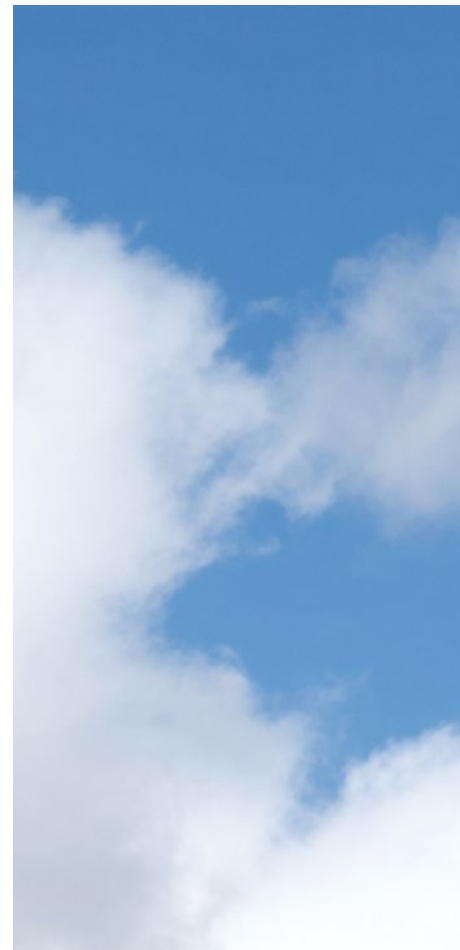
» IT service providers which are able to adapt their business models to Cloud Services and software companies which successfully manage to address large market segments with highly attractive Software-as-a-Service offerings will gain a considerable competitive advantage. «

example, the production and distribution of consumer goods – shows the lack of industrialisation of Information Technology. At the beginning of the industrial revolution large production sites would maintain their own electric power plants. Today such services are offered by specialised suppliers. This is rational as the generation of energy generally will usually offer no competitive advantage in the core business of a company.

Still, even small and medium enterprises today maintain some level of dedicated physical server infrastructure. This will usually not be economically beneficial for the enterprise: IT hardware depreciates rapidly and becomes obsolete quickly [3]. Especially for small enterprises, insufficient utilisation and

the lacking scalability of IT resources is an issue as well. Not only in the light of the ongoing debate about Green IT this point has gained importance: efficient scalability of IT resources is not only necessary for a fast adaptation of costs to demand, it is also a prerequisite for longterm sustainability.

Dedicated, local IT servers will therefore be replaced by centralised, standardised IT services, provided via communication networks. Centrally administrated services with usage-based pricing will replace dedicated IT systems. Cost benefits are derived from an efficient utilisation of IT resources and increased flexibility, i.e. the possibility to request and use resources only when they are actually needed [7, S. 8 f.].

For most large corporations this is a difficult vision of the future. Their existing IT landscapes are often heterogeneous and lacking in service standardisation. But for small and medium enterprises with their less complex existing IT systems, Cloud Services offer a realistic alternative.

Components of Cloud Computing

A widely quoted definition of Cloud Services is offered by Vaquero et al. [12, p. 50 ff.]: „Clouds are a large pool of easily usable and accessible virtualized resources (such as hardware, development platform and/or services). These resources can be dynamically reconfigured to adjust to a variable load (scale), allowing also for an optimum resource utilization. This pool of resources is typically exploited by a pay-per-use model in which guarantees are offered by the infrastructure provider by means of customized SLAs."

Thus, clouds are virtual resources, encompassing hardware, platforms, or software offerings. Their efficiency can be maximised by a provider by using scale effects to ensure optimal utilisation of individual components. Billing arrangements are usually based on usage and service availability is guaranteed in service level agreements.

The term Cloud Services describes an architectural paradigm, consisting of three core components [4, p. 9 ff.; 13, p. 76]: the technical infrastructure (computing power, memory, network), the technical platform and the software applications. These components are also referred to as Infrastructure-as-a-Service (Iaas, e.g. Amazon's Elastic Compute Cloud, HP's Cloud Enabling, Microsoft's Azure platform,

etc.), Platform-as-a-Service (Paas, e.g. Force.com, Google's App Engine etc.) and Software-as-a-Service (SaaS, e.g. Google's Apps for Business, Salesforce.com, Netsuite.com, Workday.com, Scopevisio.com etc.).

The benefits of cloud computing, especially of the application aspects, include [10, p. 4 f.]:
– **Short implementation cycles:** A SaaS solution can be employed in minimal time, often just with a click of a button.
– **Low entry costs:** Due to the usage-based pricing approach, costs are entirely linear to usage and can be planned.
– **Low risk of obsolescence:** It is in the interest of the provider to keep their SaaS offerings up-to-date. Users benefit from new releases with extended functionality easily.
– **Customisation:** Usually Cloud Services offer a wide range of configurations well adapted to the requirements of small and medium enterprises.
– **Integration:** If the SaaS provider offers webservice-APIs and Service-oriented Architectures (SoA), SaaS solutions can be integrated into existing software environments.
– **Reduced demand for own IT resources:** Cloud Services drastically reduce the requirements on the IT organisation of an enterprise in terms of required personnel and skill base.
– **Focus on the core business:** Especially small and medium enterprises benefit from the reduction of "tedious" IT-related overhead.
– **Collaboration and mobility:** Cloud Services offer instant access to the enterprise application environment anytime and from anywhere where internet access is available. This

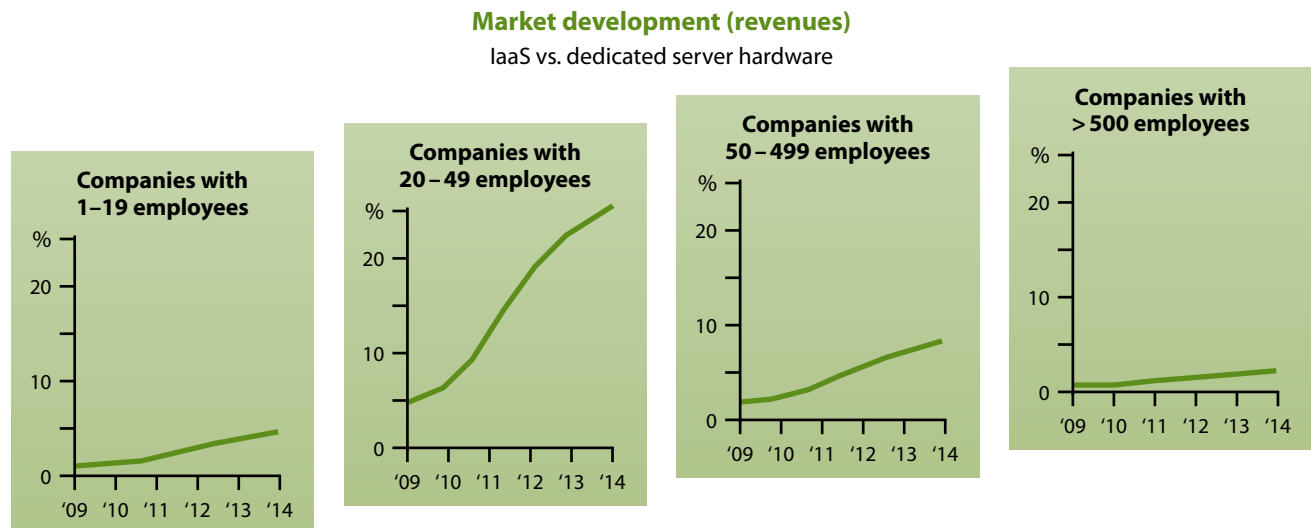**Fig. 1 │ Market development – IaaS vs. dedicated server hardware sales**

Market development (revenues)
IaaS vs. dedicated server hardware

Table 1 | Components of IT service providers' business model

	Profit margin	% of overall revenue
Server hardware resale	1 %	40 %
Software resale	5 %	20 %
Services	50 %	30 %
Other	1 %	10 %

is especially beneficial for mobile and/or distributed work-forces.

SaaS solutions usually include software, platform and infrastructure elements. Therefore the architecture of SaaS solutions is also referred to as SaaS application stack [5].

Drivers and Inhibitors

Cost benefits are a major driver for the adoption of Cloud Services associated with moving from owned IT assets to usage-based pricing schemes. Fixed costs for hard- and software are converted into variable costs, increasing the liquidity of the enterprise [7, p. 8 f.]. Scale effects and the efficient utilisation of resources reduce idle costs and overhead costs for the Cloud Service provider.

The dynamics of modern, globalised markets further push cloud adoption. Products and know-how swiftly become obsolete – to maintain a competitive advantage, product/service portfolios and business models have to be constantly adapted to changes in the economic environment, leading to dynamically changing IT requirements. The flexibility and scalability of Cloud Services allows enterprises to react more quickly and easily to changes in their respective markets [1, p. 12 ff.].

Distributed applications "out of the cloud" are increasingly associated with productivity gains: ubiquitous access to the enterprise IT enables mobile workers and home workers to use all relevant data and applications from anywhere.

The growing availability of high bandwidth internet access is also of importance. Broadband access is a prerequisite for Cloud Services because SaaS applications will only be acceptable if they react as swiftly as conventional, locally installed software. But broadband access can also be seen as an inhibitor of Cloud Services: the availability of high speed internet access in the large population centres only will not be sufficient for the geographically distributed German Mittelstand.

The most relevant inhibitors are the need to integrate Cloud Services into existing IT environments on the one hand and security concerns on the other hand. According to a survey by Forrester Research, enterprises require substantial guarantees for data protection before they are willing to move into the cloud [9, p. 6]. The use of the public Internet also raises concerns despite advances in the use of encryption techniques in Cloud Services [9, p. 12 ff.]. Today's heterogeneous, rigid, legacy-based IT landscapes very often consist of silos of dedicated IT solutions [11; 8]. The complexity of the consolidation of such IT jungles into structured, cloud-based IT portfolios – as migration paths of greenfield approaches – should not be underestimated.

Market Development

This is also the reason why it is expected that Cloud Services will be adopted more quickly by small and medium enterprises as well as start-ups, since the IT of these businesses is more transparent and simpler, and thus easier to adapt to Cloud Services.

Market research also shows this phenomenon. Figure 1 illustrates the distribution of IaaS for computing infrastructure (Infrastructure-as-a-Service versus server hardware) for different market segments from 2009 to 2014. By this time, the Cloud Infrastructure market will have reached a size of more than a quarter of a billion EUR [6, p. 57 ff.] (see figure 1).

Companies with between 20 and 49 employees appear to be forerunners in this market. Larger companies usually have IT organisations and possess the critical mass to realise scale effects, while SOHO-type enterprises (Small Office/Home Office) do not yet have IT requirements that would make Cloud Services a viable alternative.

Challenges for the SME's (local) IT service providers

Small and medium sized enterprises (SMEs) prefer local IT service providers. These providers – usually also small or medium sized – offer personal, individual, and flexible services. They know the IT landscapes of their clients by heart and they provide fast help in case of IT problems without the tedious and anonymous call centre processes of the large IT service monoliths. They usually possess at least some level of

» *Local IT service providers will need to embrace the cloud model in order to survive. Early adopters supporting their clients with the transformation their IT into Cloud Services will benefit. In order to do this they will have to become experts in Infrastructure- and Software-as-a-Service.* «

administrative rights for the client's IT systems since the client's organisation usually has very limited IT resources.

The market position of these local IT shops in the SME-segment is consequently quite strong, which makes it difficult for Cloud Service providers to penetrate this market segment – especially since the local IT service providers perceive Cloud Services as a potential threat.

To understand the effect of Cloud Services on the local IT shop it is helpful to take a look at their current business model, which basically consists of the following elements:
– resale of server hardware,
– resale of software packages,
– services, i.e. installation of server hardware and software packages, system integration into the existing IT environment, maintenance and support,
– other (resale of desktops, laptops, printers and office supplies).

Table 1 shows the typical revenue and margin distribution within the components of this business model [6]. The adaptation of Cloud Services in their respective customer segment endangers the current business model of these service providers, since hardware and software resale as well as certain services will either be rendered unnecessary or will be offered by the Cloud Service provider (see figure 2).

The loss in revenues and the corresponding erosion of profits driven by the substitution of dedicated local solutions by Cloud Services predicted by the market model described above, has a significant impact: Based on this market model, in 2020 about 18 % of the revenues for server hardware will be replaced by cloud infrastructure services (IaaS). A further 10 % of software resale revenues for communication and office applications as well as about 7 % of revenues for business applications in this market segment will have moved into the cloud (SaaS) [6, p. 64 ff.]. Given the above profit margins, an average erosion of profits of about 8 % can be expected for these players. Given the increasing margin pressure for IT Services in recent years, this business model will become unsustainable for a large number of small IT shops.

Fig. 2 | Role of IT service providers in changing IT business model
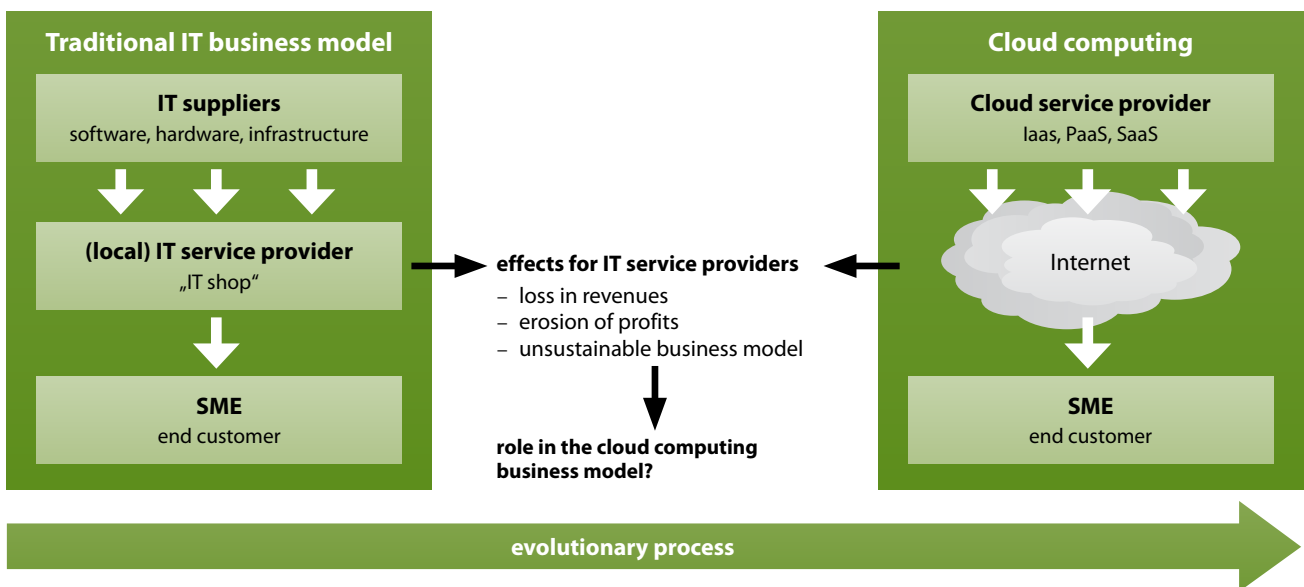
Interestingly, the solution for IT service providers may lie in a proactive adoption of Cloud Services and an adaptation of their service portfolio. A closer look at the margin distribution described above shows that for instance hardware resale plays no relevant role for the bottom line earnings situation.

In such a scenario the IT service provider becomes the mediator between Cloud Service providers and the end customer, administrating and integrating virtualised applications and dynamically managing computing resources for their customer. Here the service provider only sacrifices the least attractive components of his current business model – hardware and software resale – while expanding his margin-wise much more attractive integration and maintenance services portfolio. This also means that the IT service provider will require a deeper understanding of the business model of his client in order to enable his client to make the most of his application suites.

In order to successfully play this role, IT service providers will have to become experts on a set of SaaS business applications such as CRM, ERP and accounting software, actively enabling their clients to effectively manage their customer base and their finances. Core knowledge of specific vertical industry solutions may further help to consolidate the providers' position within certain vertical market segments.

Challenges for the SME

For the customer, such an approach means the best of both worlds: the efficiency and cost effectiveness of cloud solutions together with the flexible service and personal accountability of their established local IT partner.

The price to pay will be a diligent and critical analysis of internal processes and existing IT systems, both of which will

Lessons Learned

Adapt business models to changes in the IT industry

The IT industry is undergoing structural changes as IT resources are being increasingly provided as standardised and virtualised Cloud Services via the Internet. These changes reshape existing ecosystems. Especially the project-driven production model of system integrators and the licence-based business model of software companies is coming under pressure. These market players have to adapt their business model quickly to the current changes in their respective ecosystems.

Clear positioning of Cloud Service providers

Cloud Services as an architectural paradigm can be defined as cloud-based technical infrastructure (infrastructure-as-a-service), development platforms (platform-as-a-service) and applications (software-as-a-service). In this heterogeneous market, new entrants as well as established players should position themselves with transparent and well structured portfolios.

Optimising IT in small and medium enterprises

Cloud Services are especially well suited for small and medium enterprises with their restricted IT in-house resources on the one hand and their growing IT requirements on the other hand. These companies can benefit substantially from cost advantages and the added flexibility of Cloud Services. They should analyse their mid- to long-term IT requirements and select cloud offerings accordingly.

Small, local IT service providers should adopt, adapt and improve their portfolio

Especially small- and medium-sized IT service providers are threatened by the increasing adoption of Cloud Services by their established customer base. An analysis of their revenue and margin structure shows that to ensure long-term survival these players will need to extend their portfolios to cloud-related service. Acting as mediators between their customers and different cloud service providers will offer an opportunity to extend their business model.

have to be prepared and adapted to a more standardised application environment. While a migration to such a standardised modular IT model is difficult and costly even for the limited IT systems of the SME segment (compared to the complexities of large legacy-based IT landscapes of the corporate segment), the long-term benefits outweigh these short-term considerations.

Most of all, the SME will have to convince his long standing IT partner that Cloud Services are the way forward, or find another provider that is willing to go this way.

Evolution or Revolution?

Judging by the numbers, the transition to Cloud Services will be a slow evolutionary one. The major obstacles to overcome include security concerns and the complexities of existing IT systems on the client's side as well as a certain resistance to fundamentally changing the business models for the local IT service providers. But even a slow adoption of Cloud Services in the SME segment will mean major (and in many cases catastrophic) changes for the business model of the local IT service providers in the long run.

IT service providers willing and able to change their business models and service portfolios to embrace Cloud Services will be the ones that will be able to strengthen their position in the market and to improve their overall margins. Laggards will face further deterioration of profits as their customer base slowly but inexorably moves either directly to Cloud Service providers or to the more adaptive local IT service providers.

Cloud Service providers, on the other hand, will have to learn to perceive the local IT service providers as a potential channel and to cater for their specific needs. Revenue share-based incentive models enabling the IT service provider to participate in the Cloud Service provider's recurring revenue streams might be one way to establish this essential sales channel.

In the mid-term a new ecosystem will emerge with the SME's local IT service provider adopting the role as mediator and service integrator between his SME customer and Cloud Service providers.

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