White Paper Cloud Computing: Thin clients in the clouds
Cloud services represent an attractive and cost-efficient continuation of server-based computing and application service provider models. In combination with universal thin client solutions, the cost benefits apply not only to the data center but also to desktops.

The term cloud computing has not yet been clearly defined but the media already see it as another computing hype. Is it just a new "buzz" or a real trend? According to an IDC survey, 54% of German IT managers are hoping for a reduction in fixed costs through web-based products, services and solutions (cloud services). In reality only a quarter of the companies are actively addressing the issue but already a third of those are actually using cloud services, which includes amongst other things the rapidly expanding field of "software as a service" (SaaS). According to a study by the U.S. research and consulting firm Saugatuck Technology, the global share of companies with at least one hosted Internet-based software solution will rise to 65% by 2010. Alongside SaaS, cloud computing also covers the provision of complete infrastructure systems including servers, storage systems or networks. These are provided easily, with scalability and in real time via the Internet by external providers and billed according to usage.

What is cloud computing?

There is still no standard definition of the term. IDC sees it as both cloud technologies (infrastructure systems such as servers, storage systems and networks) as well as the cloud services these technologies provide. These include products, services and solutions that are offered easily, with scalability and on a short-term basis by third-party providers. They can be used via Internet browsers and paid for on a rental or per-usage basis. The U.S. research and consulting firm Saugatuck Technology defines cloud computing as on-demand infrastructures (PCs, storage, networks) and on-demand software (operating systems, applications, middleware, management and development tools) that are adapted dynamically to the requirements of business processes. This also includes the ability to run and manage complete processes.

Modern server-based computing

Cloud computing can be seen as the modern, if not ultimate, form of server-based computing (SBC). SBC dates back to the time of mainframes and made a comeback with Citrix® and Microsoft® Terminal Services. Today major IT players like IBM, Microsoft or Google see the cloud (the Internet) as an enormous networked mainframe that opens up new savings potential. The appeal of cloud computing is even greater if the computing technology on the user side does not tie up unnecessary computer center and desktop IT resources. Particularly in the desktop area, economic efficiency can be optimized using thin clients. Not only are they more cost effective than PCs, they are also very flexible and in addition to cloud services, can be used to deploy virtual desktops or SBC applications hosted centrally within the company. In the latter case, thin client computing requires only half the energy of a PC-based client/server network, according to a study by the Fraunhofer Institute for Environmental, Safety, and Energy Technology UMSICHT. The total cost of ownership (TCO) of the desktop infrastructure is reduced by up to 70% (Fig. 1).

Homework for providers and users alike

According to the market analyst IDC, the reticence of companies to deploy cloud services is based on the fact that providers still have much to do: Practical application, integration with existing systems, reference projects and a personal point of contact for support top the users’ wish list (Fig. 2). Surprisingly, data security only represents a serious drawback for 11% of those questioned. However, it may be another year or two before large cloud platforms like Amazon Web Services, Microsoft Azure, Apple iWorks.com or Google App Engine are well established at corporate level. Companies and public authorities should use this time to undertake the work necessary at their end and set up their own efficient and technologically flexible desktop infrastructure. Otherwise the financial benefits of outsourcing may well be wiped out by excessively high internal desktop costs. Traditional PC-based client/server computing is, in addition to unnecessarily high power consumption, associated with high costs for security and patch management, hardware repairs as well as damage and time loss due to user self-help attempts.

1 http://it.umsicht.fraunhofer.de/TCecology/index_en.html
2 http://it.umsicht.fraunhofer.de/PCvsTC/index_en.html
Future-proof desktop concepts

Thin client computing has been used successfully for the last twenty years. According to IDC already one in eleven commercially purchased desktop devices in Europe is a thin client. Established providers, such as Germany’s market-leading IGEL Technology, have over twenty years of experience in the industry providing technologically groundbreaking solutions. The firmware of the IGEL Universal Desktops supports all major IT provisioning methods from traditional terminal server computing through to virtual desktops and cloud computing. It is the technological openness of the thin client firmware that is so critical because cloud computing solutions are not necessarily designed for Windows desktops. Indeed they see themselves rather as an alternative to Windows-based computing. In practice, cloud services are combined with other provisioning models, which is why IGEL equips its thin clients not only with Internet browsers including runtime environments (Java or Microsoft® .NET), plug-ins like Acrobat Reader and media players, but also with typical SBC protocols, among them Microsoft® RDP and Citrix ICA or X.11. The very latest connection brokers, such as VMware View™, Leostream® or Ericom PowerTerm™ WebConnect, also provide access to virtual desktops.

Cloud-based desktop management

Cloud computing-oriented thin client solutions are also characterized by web-based desktop management and support, using Internet protocols like HTTP or FTP. Therefore, the administration of the desktop infrastructure can be outsourced as a cloud service – another means of reducing fixed costs. In this case web-based management solutions like the IGEL Universal Management Suite (UMS) are helpful. The UMS is equipped with a Java-based and therefore platform-independent console, supporting various database formats. These in turn allow efficient group-based thin client administration. Remote administration is SSL/TLS-encrypted and bandwidth-efficient via the management server, meaning the time and expense required for port opening are minimal.

Another requirement for future-proof thin client solutions is the ability to update the thin client firmware as well as web browsers and add-ons efficiently and on a time-controlled basis. There should also be sufficient free firmware memory available for future updates. For example, the Google browser ‘Chrome’ with its own runtime environment called Google GEARs could be an interesting future firmware extension. It could be used to access an independent desktop that is hosted in the cloud, via which Google applications can be used both on- and offline. The latter can now even be integrated in Microsoft Outlook. Microsoft® Azure likewise promises a cloud-hosted desktop in which even local and mobile Windows® applications could be integrated alongside .NET services.

Security in the cloud and on the desktop

Surveys like the aforementioned IDC study prove that users expect ever increasing competence from cloud computing providers when it comes to data security. More and more banks are outsourcing their IT to external service providers. In Switzerland, 70% of the banks have already outsourced either all or part of their IT, according to the provider Services4Banks AG. Vital factors here are that the outsourcing service provider has sufficient professional know-how, the data is anonymized and the availability of the data is guaranteed by corresponding service level agreements. Ideally such outsourcing packages also include provision of the desktop infrastructure. A corresponding example from Germany is Finanz Informatik, the IT service provider for the Sparkassen-Finanzgruppe, a German savings banks group, whose complete bank solution OSPlus can also encompass thin client computing with remote administration and support. Certainly, thin clients for such scenarios must also support virtual private networks (VPN) and different encryption methods.

Summary:

Thin clients are future proof

Flexible thin client solutions can utilize the specific advantages of provisioning technologies to deliver cloud computing. Some thin clients, such as IGEL Universal Desktops, were developed with this technology in mind and are future-proofed for the evolution of cloud services. In terms of a Universal Desktop, the units also offer terminal emulations and clients for VoIP or video conferencing (H.323 Standard). The example of IGEL shows how the idea of server-based computing is being consistently further developed and is successively finding its way into the
desktop environment. The combination of cloud services, efficient desktops and internally hosted SBC solutions (including virtual desktops) offers a solid basis for increased economic efficiency in the IT department of companies and public authorities.

**Fig. 1: Total costs comparison: PC versus thin client**

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Source: Fraunhofer Institute for Environmental, Safety and Energy Technology (UMSICHT): PC vs. Thin Client – Economic Evaluation (http://it.umsicht.fraunhofer.de/PCvsTC/index_en.html)

**Reasons for and against the use of cloud services**

**Opportunities:**

1. Great rationalization potential: infrastructure and services can be leased based on requirements and usage. Effect: lower data center and infrastructure costs, including power consumption, lower administration costs. Global trend: countries with low energy costs are becoming the preferred locations for large-scale data centers.

2. High availability and disaster recovery – high priority for providers: The U.S. provider Salesforce.com has not recorded a single failure during the last 15 months.

3. Combination of local, hosted and cloud services to form one independent corporate application suite.

**Risks:**

1. Products not yet sufficiently field tested: integration of existing systems / files unclear or problematic; sudden changes to products or conditions.

2. Lack of compliance, concerns about service levels and support (no personal point of contact).

3. Security concerns: sensitive data not in-house but “somewhere” on the Internet, private data may be accessed by market-dominant providers; backdoor problems: access by state intelligence apparatus; industrial espionage.

4. Unclear pricing models: many cloud services are free of charge for consumers; cost structure for corporate users often unresolved.
Fig. 2: What stops companies using cloud services (IDC)

- Cloud computing must be practical in application: 89%
- Integration with existing systems/data: 85%
- Evidence of reference projects: 78%
- Personal points of contact are important: 67%
- Compliance guidelines must be fulfilled: 67%
- Clear communication of offers/benefits: 59%
- Guarantee of data security: 11%
- Other: 30%

Fig. 3: Which cloud services are currently being used (IDC)

- Business applications: 42%
- Servers (computing capacity): 37%
- E-mailing tools: 30%
- Office applications: 25%
- Storage: 25%
- Security tools: 20%
- Backup: 20%
- Collaborative tools: 20%
- Business community tools: 17%
- System infrastructure software: 16%
- Platform for application development: 9%
- As yet undecided: 8%
- Unified Communication solutions: 7%
- Other: 1%

Multiple responses possible