

Cloud Computing

A Cloud with more than a Silver Lining

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By Ben Rodenhäuser

Cloud Computing is the buzzword in the IT industry at the moment. But what is actually behind the software from the cloud? Should business react to this trend?

Many observers consider it an IT revolution, and the American author Nicholas Carr likes to compare it to the transition to centralised, national electricity supply at the dawn of the 20th century. At the onset of the Industrial Revolution, it had been customary to generate electricity where it was needed. Now, following in the footsteps of innovations by inventors such as Thomas Edison, extensive networks – fed by a small number of large-scale power stations – began to cover the entire nation.

"The same will happen, some time toward the end of this century", Carr writes in his book "The Big Switch". Today, information technology has significance similar to that of electricity at the close of the 19th century: it is a core asset, and many businesses even consider IT to be a separate corporate operation. But IT will become a service supplied through a common infrastructure and, in many cases, charged similar to electricity – yet not in kilowatt-hours, but gigabytes.

There have been repeated efforts in the past to build similar infrastructures – in the 1960s, it was already possible to receive processing power from central mainframes using one's personal telephone extension. However, these early experiments never prospered, stuck in the bandwidth bottleneck. Instead, the exact opposite became reality, i.e. a radical decentralisation of IT. Following Bill Gates, we now have on every desk a computer running Windows and Office. Gates' vision was realised as an element of the client-server architecture, with desktop PCs connected to form large-scale business intranets.

Chances are that precisely the model which build Microsoft will appear, with hindsight, antediluvian in ten years time. Is it really a sensible use of resources if corporate data centres operate at ten percent capacity because they have to be designed for peak loads which inherently will hardly ever be attained? Isn't it wasteful that, according to a 2005 survey of the market intelligence firm IDC, only 16 percent of all software bought by businesses is actually ever used? And is it efficient to install millions of copies of a single application on many millions of computers?

The Network as a Computer

For several decades, there was no viable alternative. However, the very moment bandwidth ceases to be a bottleneck, but rather becomes a veritable gateway for streams of every kind of data, “the computer will be hollowed out and distributed over the network” – thus the oracle of Eric Schmidt, Google’s current CEO. Users will still be sitting in front of their desktops. But the latter will have changed surreptitiously and turned into “webtops”, grabbing all necessary data, services, and applications from the grid.

As a matter of fact, the bandwidths of modern Internet connections are already able to compete with slow local nets. Mobile Internet access also increasingly provides tolerable working conditions – and 4G will inevitably follow 3G (i.e. UMTS). Accordingly, Schmidt’s prophecy is about to become reality: “cloud computing” is taking shape – the expression “cloud” stemming from the fact that the Internet is often drawn as a cloud. With cloud computing, the Internet is your computer.

Today, there is already an extensive range of software available as a service from the grid, from Google’s applications for spreadsheet processing and word processing, to Photoshop express for online picture editing and fully-grown enterprise applications such as the CRM application Salesforce. SAP will also shortly be marketing a cloud application, but had to push back the launch a number of times – one indicator that cloud computing will pose novel problems for established users.

The interface users rely on to access the cloud remains, in the majority of cases today, the web browser (in the future, the desktop and grid might be far more integrated). Whereas common browsers have the characteristics of a document which the user downloads from the net to study on his personal computer, Google’s recently presented browser Chrome is purposely optimised to operate as a platform for web-based applications.

Here, the emphasis is not merely surfing through pages, but executing applications: web applications running in Chrome have the look and feel of desktop applications, evident in many details. Chrome lacks, e.g., an interface element which displays how much of a page has already been downloaded – this would be pointless for web applications which continuously exchange data between distant server and local client.

Cloudsourcing: For and Against

In the corporate environment, cloud computing can be interpreted as a kind of “cloudsourcing”, comparable to transferring production steps to subcontractors. Cloud computing makes it possible to outsource all kinds of IT capacity to the grid. Just like regular outsourcing, there are economic incentives for doing so, and it is on these that most current debates focus.

Naturally enough, most worries emphasise the security factor – transferring documents back

and forth between a supplier who might be anywhere on the net and one's own computer will push the boundaries of any corporate firewall – and this alone is a nightmare scenario for wary business users. But the seamless availability of IT from the cloud is also considered a stumbling block; furthermore, as we have seen above, the speed of cloud applications leaves room for improvement.

The current range of available offers is neither broad nor mature enough to grid-base all digital business processes – the transformation to Cloud Computing will have to be effected gradually, and is a technological and logistical challenge in itself. There are already pioneering service providers specialised in cloud migration, i.e. transferring IT resources to the net.

When we look at the drivers, the inefficiency of the current IT paradigm is an important factor. Businesses hope to realise considerable cost savings by outsourcing at least parts of their IT to the grid. Another contribution is to come from, e.g., lower maintenance and personnel costs: If businesses increasingly push Cloud Services, the IT department's staff can be correspondingly reduced. Cloud Computing, its proponents hope, will make corporate IT more manoeuvrable and bring it up-to-date with actual requirements. Once a company has found its new IT base in the Cloud, switching from old to new systems should be effected easier.

These considerations are reflected in sound cost-benefit assessments: In eyes of many managing directors in SMEs, a little less security and a slightly lowered availability will seem to be acceptable in view of significant savings potentials in a service which is not, in a more restricted sense, security critical. This managerial perspective, however, shows just one side of the coin, since it suggests that everything will stay the same, but be cheaper, using the new paradigm of rented software.

This mirrors the idea of the automobile as a horseless carriage – overlooking the qualitative advantage of the new over the old. But what are the actual consequences of the computer dissolving into the cloud? The following four features are characteristic for tomorrow's Cloud Computing.

1. The Cloud Is Everywhere

If you have ever, at the end of a day at the office, loaded important files onto a USB stick to continue working with them at home, you'll be aware of this problem: The more different devices we use, the more difficult it becomes to maintain control over the data saved on them.

In the case of Cloud Computing this is a non-issue. Information will always be synchronised and available – end-devices are only clients accessing data stored on the grid. The users may

rely on different devices, but ultimately, he only uses a single, omnipresent computer in the cloud.

With Cloud Computing, an ever-growing number of devices, products, objects, and surfaces in our everyday life will be equipped with processors and connection interfaces – from smartphones to laptops to the onboard computers of your car. A single, all-connecting computer becomes a downright necessity.

2. The Cloud Is Modular

Applications on desktops live in isolation, are blind to the external world, and remain – vice versa – invisible for the latter. Cloud applications, by contrast, are always available as components for other applications. They are resources which can be combined like modules. The Cloud is a grid of services which can be assembled like pre-cast segments – and that's a major part of its magic.

This corresponds to a new view IT performance, which no longer has to be built up, but merely accessed: it is, from the user's perspective, simply available and only has to be configured individually. There are already platforms with modular systems which allow for the assembly of data and applications, in particular in the consumer area where Cloud Computing has already achieved higher maturity and popularity.

Yahoo Pipes which offer RSS-feeds, blogs, and news pages can, e.g., be searched for new content, modified, or recombined. In corporate services, for instance, the company Serena supplies what is referred to as "business mashups" which help in combining applications from provided components for minor everyday tasks, e.g. for processing leave calculations.

3. The Cloud Has Sensors

In the future, users will no longer access the Cloud's offers in the form of search questions, but by demanding complex tasks. The tremendous computing power available to everyone has to be applied, after all. In order to complete these tasks, the Cloud will need more information than ever before – it will turn into a data-collecting kraken. PCs were fed by their users' active input. The computer in the Cloud, however, will also process, e.g., behavioural statements or the spatial position of objects and persons.

The Cloud will have its feelers everywhere, thanks to an extensive network of sensors, and in the extreme case will be able to register the proverbial bear shitting in the wood. Here, the reward is not in the individual incident but in recognising patterns in large amount of data – Reality Mining is the expression coined by researchers at the renowned Massachusetts Institute of Technology (MIT).

The soon-to-be-marketed, matchbox-sized device Fitbit, for instance, records its user's movement profiles which can then be analysed and compared online. Another service already available, Citysense, charts the GPS signals of cell phones to create a real-time picture of the socialising activities of the citizens of Chicago – and sends it to your Blackberry and soon also iPhone.

4. Cloud Computing Is Social Computing

Since the World Wide Computer will be shared by all its users, the application space created by Cloud Computing will be, by definition, a social space. The PC, on the other hand, is by its very name meant for the use of one person only. This addresses one notorious weakness of our current office use of IT: collaboration. Any collective work on documents will degenerate to an email battle.

Against the wishes of those involved, the version history of collaboratively created texts and presentations will often be subject to unexpected diversions once two users believe that they are working on the master document. In Cloud Computing, on the other hand, teamwork will be the norm. It will still be possible to withdraw to a private space, but a single click will suffice to open it to other users.

Conclusion: The World Wide Computer

What is the resulting vision if we combine these characteristics – everywhere, modular, sensing network, and social computing? The Internet as we know it is a grid of information. Cloud Computing promises to turn the grid into a network of functionalities: a gigantic, global mega computer, managing all its tasks with tremendous computing power and distributed intelligence, open to individual configuration by any user, tirelessly collecting global knowledge, and accessible through every kind of interface.

According to its underlying idea, the Cloud is an omnipresent, modular, with ubiquitous sensor equipped, social problem-solving machine for all kinds of computable problems: a World Wide Computer – and as such, it towers far above the original version of the World Wide Web as a gigantic knowledge network.

About the Author:

Ben Rodenhäuser is a trend and futures researcher at Z_punkt The Foresight Company, a consulting agency for strategic future issues. The focus of his work is on networks, consumption, and urbanity.