Highs and lows

As IT gets cloudier, the economics of the business will change

EVEN elephants can die. In 1993 extinction came close for IBM, then the world's largest computer-maker (it has since been overtaken by HP). Its mainframe business was collapsing and profits were plummeting. At that point Louis Gerstner took over as chief executive and managed to turn the company around. "Only a handful of people understand how precariously close IBM came to running out of cash in 1993," he writes in his memoir, "Who Says Elephants Can't Dance?[1] "Whether we would have had to file for bankruptcy, I can't say."

There are many reasons why IBM nearly went belly-up, not least the fact that Big Blue had become a bureaucratic monster. But most critically, it had failed to adapt to the industry's first big platform shift, which only really made itself felt in the early 1990s: the move from mainframes to smaller machines, first so-called minicomputers, then personal computers. "IBM was slow, very slow, in delivering distributed computing, and many small companies moved in to fill the gap," Mr Gerstner writes.

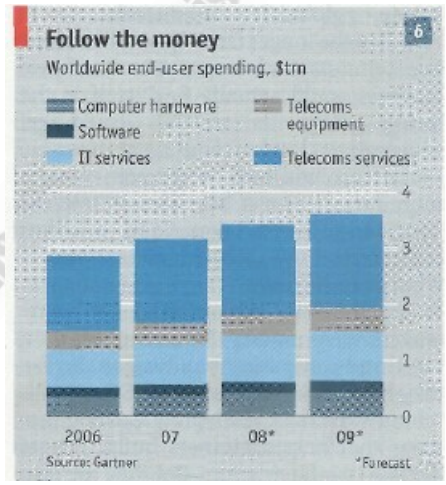
It is unlikely that the move into the cloud will produce a similar near-death experience or even a real casualty-if only because IBM still stands as a warning. But that does not mean that the structure of the IT industry will remain unchanged, nor that the economics will stay the same. Once the IT sky really clouds over, individual firms' share of the global IT budget (see chart 6) will shift.

The move to distributed computing, which started in the mid-igSos, led to a big change in the IT industry. In the era of the mainframe computing came in a vertically integrated package, mainly from IBM. With distributed computing the industry became a stack of horizontal layers. In corporate IT these were mainly hardware, the network, infrastructure software (such as operating systems and databases), enterprise applications and IT services.

Not all of these layers were created equal. Computer-makers commanded a thicker one, for instance, but software companies were more profitable. The key program was the operating system, both on servers and on personal computers {"clients"). It was the standard to which other components of IT systems had to conform. Usually this was a version of Windows, which made Microsoft the IBM of this new era of computing.

Cloud computing is unlikely to bring about quite such a dramatic shift. In essence, what it does is take the idea of distributed computing a step farther. Still, it will add a couple of layers to the IT stack. One is made up of the cloud providers, such as Amazon and Google. The other is software that helps firms to turn their IT infrastructure into their own cloud, known as a "virtual operating system for data centres".

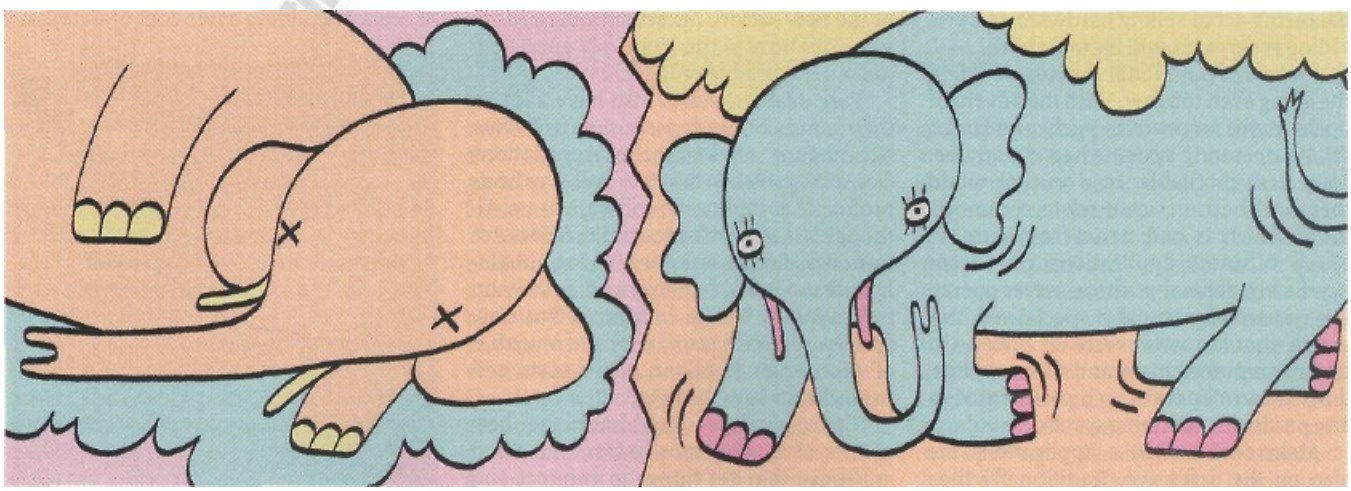
Drawing a neat diagram of the IT stack



will also become increasingly difficult because the layers are becoming less distinct. In a world of services it often does not make sense to think of hardware and software separately, argues Padmasree Warrior, the chief technology officer of Cisco. Both need to be blended to offer new services, she says.

Mix and match

Even though the IT stack may not change all that much, the perceived value of the different layers will shift, and with it the amount of profit IT firms can make from each of them. Who will lose and who will win depends on how much of computing



^ eventually moves into the cloud.

In the first round almost everybody in the IT industry will do well as the clouds are being built The biggest winners are likely to be hardware-makers, says Mark Stahlman of Gartner: "Hardware always wins when new demand for computing is uncovered. And we haven't had such a sweeping global demand since the 19905."

But in the longer term there will be relative winners and losers. The hardware business could actually find itself in the losing group. Its margins could get squeezed as cloud computing matures because there will be fewer customers with more buying power, says James Staten of Forrester Research. Large cloud providers can dictate how to build servers and at what price, he notes.

All that may explain why hardware-makers were among the first to jump on the cloud-computing bandwagon. So far, they have done only what Mr Staten calls "cloud-washing": relabelling existing products that help customers build a more flexible IT infrastructure. But they are also preparing for a time when more money can be made building clouds than building computers. IBM and HP, for instance, have teamed up with other firms and universities to design new cloud architectures.

Which **side** of **the** fence?

In the long run, says Mr Staten, hardware-makers may be torn between supplying cloud providers or becoming providers themselves. Being both will not be easy, because the firms would be competing with their biggest customers. Dell seems to have decided to be a cloud supplier. Sun Microsystems is a candidate to become a provider; it is offering a cloud-like service called Network.corn, albeit not very successfully. HP and IBM, already used to the balancing act of selling hardware and providing IT services, will try to do both.

Makers of traditional software will find the going even tougher. With the advent of open-source software, in particular Linux, selling operating systems had already become less profitable. In a virtual world they will become even more commoditised, which is bad news for Microsoft. Many business applications no longer need a big, general-purpose server operating system but can use a specialised one, which should put pressure on prices. On client computers, more and more applications are written to run in browsers, not on any particular operating system.

Makers of business applications are also on the defensive. Traditionally they have made billions by selling their programs, often demanding hefty sums to install them and then charging an annual maintenance fee for upgrades and technical support. But this highly lucrative business model has come under increasing pressure, says Michael Cusumano, a professor at the Massachusetts Institute of Technology (MIT).

For one, he says, software vendors will have to find new ways to charge for their wares: in the cloud, tying licensing fees to the number of users, for instance, will be difficult, since services will mostly be consumed by other machines. More importantly, the corporate world has become less and less willing to buy software for large sums of money, so software firms listed on America's stockmarkets now make most of their profits from maintenance and other services (see chart 7). SAP will increase its annual maintenance fees to at least 22% of a program's value over the next few years, in line with those of Oracle, its main rival.

Yet the biggest challenge for software firms is to become providers of online services themselves, says Brent Thill of Citi Investment Research. So far they have moved slowly, offering saas only on the side, if at all. This was partly because their customers were not that keen. But more importantly, notes Mr Thill, the software houses are still wedded to their old business model. With saas they do not get a big upfront payment, only subscription fees.

Once Salesforce and NetSuite had shown that the saas model works, the incumbents began to move faster. In September last year, for instance, SAP presented "Business ByDesign", a package of web-based enterprise applications for smaller businesses. But success will not come easily. SAP has slowed down the introduction of the new service because it still needs to work out how to run it cheaply enough to make a reasonable profit

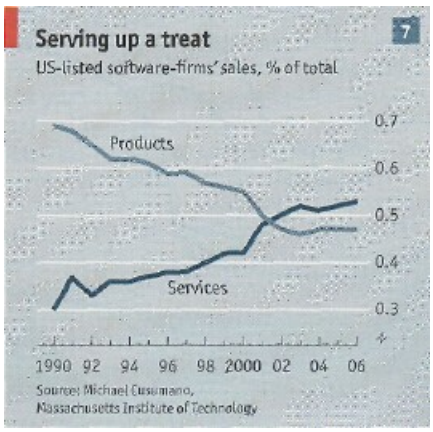
Pure saas providers also have a lot on their minds. Some experts, such as Joshua Greenbaum of Enterprise Applications Consulting, reckon that few will ever be as profitable as traditional software firms. Although it is almost a decade old, Salesforce started making money only in 2006, mainly because it first had to spend heavily on marketing to attract customers. But now that the service has 1m users and revenues of more than *$1* billion, these costs will come down, says the firm.

The companies that have the best chance of making money from the cloud are those that get things to connect and work together and help customers move their computing around. This is music to the ears of big IT firms, not least IBM. Nearly 80% of its revenues come from infrastructure software and IT services, which it can offer globally. HP is catching up, having taken over EDS, another big iT-services firm.Both Microsoft and SAP, for their part, believe that firms will want to have a choice in where to do their computing, as well as the flexibility to move things around over time.

Two potentially important contestants are rarely mentioned: Cisco and EMC, the leading makers of networking and storage gear respectively. Having invested a lot in software and services, Cisco has become more than just the source of most of the world's routers, the traffic cops of the internet. It is betting that in the cloud the network layer will become more important, for instance to ensure that computing workloads are able to move around securely. EMC, for its part, has made two dozen cloud-related investments and launched a cloud-infrastructure division.

Whoever manages to own the dominant operating system for the data centre could become a big winner. VMware is bound to have a shot at this. As well as being the market leader in virtualisation, it has the support of EMC, which holds 86% of the firm. But the competition is likely to be intense.

Will this prospective platform war produce a dominant company in the mould of IBM or Microsoft that is able to extract more than its fair share of the profits? Probably not, because it will be relatively easy to switch between vfJidors, says George Gilbert of Tech Strategy Partners, a consultancy. Nor is it likely that one firm will manage to build a global cloud monopoly. Although there are important economies of scale in building a network of data cen-

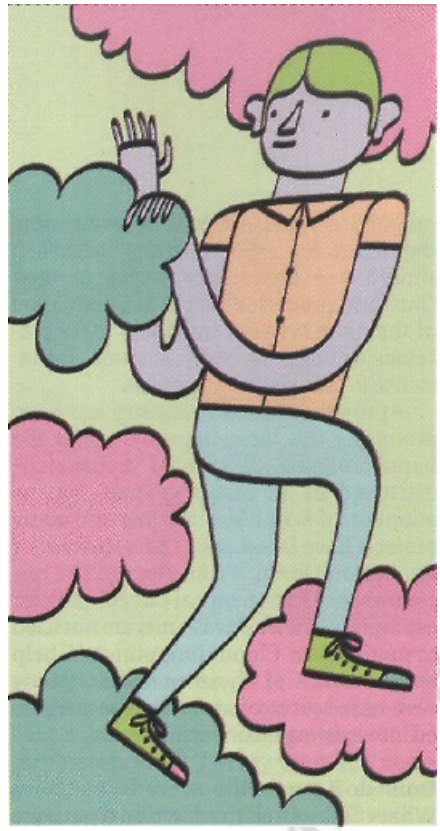


tres, the computing needs of companies and consumers vary too widely for one size to fit all.

Even if the cloud is likely to transform the IT industry, some things will stay the same. One is the importance of lock-in. If anything, companies and developers will be even more dependent on cloud platforms and applications than they are on the old kind, saas promotes the "hollowing out" of IT: a firm that needs to migrate to another system will no longer have the required expertise. When Facebook, say, makes a change, to its platform, developers have no choice but to go along with it. Some are already calling for a "Cloud Computing Consortium", in the mould of the World Wide Web Consortium (wsc), to set standards that allow applications to migrate easily from one platform to another. One standard initiative, called "OpenSocial", already allows the same web-based application to run in several social networks, which are also clouds of sorts.

But standards go only so far. Some fear that one company could try to monopolise other key parts of the cloud; ironically, Microsoft worries that Google is doing exactly that with the online advertising market. To Steve Ballmer, Microsoft's boss, Google's advertising platform is like a flywheel that picks up speed as more websites attract more advertisers, and vice versa.

Eric Schmidt, Google's chief executive, denies any evil intent to achieve world domination. He argues, with some justice, that it would be hard for Google to control the cloud, if only for technical reasons: much of it is already based on open standards, and its loose structure does not lend itself to locking customers in.



Mr Schmidt promises that Google will not lock its users in either. "Our competitive advantage is not from lock-in", he says, "but from having specialised knowledge of how to build data centres and how to build new software that is not reproducible, such as our search algorithm. This is how we make our money."

Yet Google is more like Microsoft than it likes to admit, says Nicholas Carr, a technology writer and blogger. Microsoft, he argues, achieved its dominant position in the PC world not least by commoditising products, such as the browser, that are complementary to its cash cows, such as Windows: as their cost came down, demand for Microsoft's products went up.

Similarly, Google's natural instinct is to do its utmost to encourage people to spend more time online, because that will give the company more opportunities to sell advertisements and collect data about them. According to Mr Carr, almost everything the company does-building huge datacentres, fighting copyright restrictions, digitising the world's libraries, developing a new browser and, most recently, even helping to launch satellites—is aimed at increasing the use of the internet. "Google wants information to be free", he recently wrote in his blog, "because as the cost of information falls it makes more money."

But Google may never become as powerful as Microsoft because regulators are unlikely to let it. Microsoft was eventually put in the dock for abusing its monopoly because it got too greedy, pushing most of the rest of the industry to complain. Given that the world has already lived through the Microsoft drama and that Google will affect many more industries, the search company is likely to be restrained much earlier. The firm is currently in negotiations with the us Justice Department about a controversial advertising partnership between itself and one of its competitors, Yahoo!, which would further strengthen Google's position in online advertising.

Even if the economics of the cloud are still in flux, though, it is already clear that it will have far-reaching implications for businesses and for society as a whole. ■

Highs and lows. **The economist**, New York, p. 13-15, oct 25th-31st. 2008.