

## Where the internet lives

In the age of cloud computing, mega data centres are the new home of technology services, writes **Maija Palmer**



In the middle of a scrubby business park on the outskirts of Dublin, a hulking grey building has recently sprung up. It is protected by high, spiked railings and two sets of steel security barriers that are thick enough to stop a tank. There is no name above the door, but this 303,000 sq ft industrial building is Microsoft's new mega data centre, its first large-scale computing facility in Europe, representing an investment of \$500m (£300m, €335m).

Inside, thousands of servers wink small lights and hum in orderly rows in the dark, cavernous cool of the building, serviced by 30 or so human attendants. The football pitch-sized server halls, high ceilings and lifts big enough for a forklift truck are not sized for people. This is a cathedral to machines.

As Microsoft likes to put it, the internet – at least in part – lives here. Some 250 of the company's web-based services, including the Bing search engine, Hotmail and MSN Messenger, are run from the facility.

Perhaps more significant, Microsoft is now running Azure, its recently unveiled "cloud computing" platform, from the Dublin facility. Cloud computing has become the umbrella term for the provision of computing power to customers over the internet from a remote data centre. The idea is that companies, including Google and Amazon, will rent computer capacity and storage to customers over the internet for a few cents an hour.

Facilities such as the Dublin centre are springing up all over the world but, for competitive and security reasons, the companies building them are secretive about where they are being built and have only revealed partial lists of their locations. In addition to Dublin, Microsoft has admitted to having facilities in Chicago, San Antonio and Quincy, Washington. The company is thought to be adding 10,000 servers a month to its arsenal.

Google is estimated to have about three dozen data centres, while Amazon is known to have facilities in various US states, as well as in Dublin, Frankfurt, London, Hong Kong and Tokyo.

According to analysts at Tier1 Research, the global internet infrastructure market is expected to be

worth \$29.8bn in 2009, rising to \$50.6bn in 2012.

"There is a \$30bn opportunity in the cloud," says Jean-Philippe Courtois, president of Microsoft International. "A lot of small businesses will adopt this, consumers are doing it already. With big enterprises we will see a hybrid scenario where a lot of companies will want some applications to remain physically on their sites."

Having Microsoft, Google or Amazon host corporate data can be a cheaper way for companies to harness computing power. Small start-up companies, for example, do not have to invest in their servers but just pay as they go. Big companies, such as Nokia and GlaxoSmithKline, are already using this to cut the cost of providing services such as e-mail to thousands of employees.

However, trust is a big issue. While companies might be happy to put simple functions such as e-mail online, they are more hesitant about critical data. "We are not putting our family jewels in the cloud, just mail and calendar functions," says Jeremy Vincent, chief information officer of Jaguar-Land Rover, the car company, which recently became a Google customer. "We'd like to keep our core competence in-house."

To convince clients to make the switch, building a data centre has turned into something of an art form. Security, for example, is key. "Chief information officers come and look at the data centre and ask about security," says Kevin Timmons, manager of data centre operations at Microsoft. "It starts with the way the centre

**Houses of data: Microsoft has mega centres in Chicago (above) and Dublin (below) that form the backbone of its web-based services** Microsoft

looks from the outside." Hence, the forbidding fences, railings and barrier controlling access to the facility.

Security of power supply is the other key concern. The ground floor of the Dublin centre is a miniature power station. There are two enormous grey metal cabinets – 11,000-volt substations – at opposite ends of the building, which suck in electricity from Ireland's national grid. These are operated through a series of keys, the same procedure as in nuclear power stations. At its peak, the centre will use 22.2 megawatts of power – about the same as a small city. The hum and whine of the electricity as it is converted into a more usable 400-volt form is deafening.

There are two substations in case one supply should fail. There are rooms filled with hundreds of petrol canister-sized batteries that can run the centre briefly if both power supplies fail. There is also an array of tractor-sized diesel generators, which can run the data centre indefinitely if the entire power grid fails. There is enough diesel on-site to run the generators for six days and arrangements with fuel suppliers to begin delivering fresh stocks within four hours.

Location is also key. According to Microsoft, Ireland's rainy and cool climate is ideal for running big computer facilities. With chilly temperatures year-round, the data centre can be cooled just by sucking in outside air and blowing it through the rooms. Air conditioning can make up about two-thirds of the costs of running a typical data centre, so this represents a huge saving.

"We have air conditioning in case Ireland has a heatwave, but our goal is to never switch it on," says John Dwyre, international data centre manager at Microsoft.

Energy-saving features are crucial, as concerns grow in Europe about the carbon impact of data centres. "Carbon caps and climate change are really starting to impact on the shape of the cloud," said Mike Manos, who leads construction at Digital Realty Trust, a company that builds and runs data centres.

Legal requirements also play their part. Under European law, some types of information, such as customer credit card details, cannot be trans-

ported beyond the European Union's borders. Thus, cloud computing companies need data centres in places such as Dublin to keep these data for their European clients.

"It is something governments are very nervous about," says Dan Searle, chief executive at Dot Net Solutions, which provides tools to help companies develop software.

Then there is the issue of tax. The era of internet commerce has already allowed companies to locate their operations in tax-friendly regimes. Many online gambling sites, for example, base their data centres in Gibraltar to take advantage of its 1 per cent gambling tax, while internet retailers such as HMV and Play.com run operations from the Channel Islands so they can sell goods without value-added tax.

As companies have more and more operations hosted in remote data centres, they could take advantage of different tax regimes, says Mr Manos.

"There is already a trend called 'follow the moon', where developers write applications that will move from data centre to data centre, depending on where the power costs are the cheapest, usually at night," he says. "The same concept could be used for taxation, with applications migrating to the area of lowest tax."

It is currently understood that digital transactions are taxed in the jurisdiction where the servers are located, says Tracy Neighbors, tax expert at Microsoft. Companies using the Dublin data centre, therefore, should be able to benefit from Ireland's relatively low tax rates. However, he admits that applying tax laws to e-commerce is still a somewhat "fuzzy" area.

Moreover, choosing a base relies on a number of considerations. "We have 35 different criteria when deciding on the location of a data centre. Tax is one of them," says Mr Courtois.

In the meantime, data centre companies are mainly gearing up for huge expansion. There is room at the Dublin site to at least double the size of the Microsoft centre. Behind the building, green fields fan out as far as the eye can see. Once these might have been for cabbages or flax, but now they wait to see if rows of computers will be sown here instead.

haven't been asking about cushy, multinational expatriate postings with "hardship allowance". No, it's all about setting up their own business or joining a local company.

Several of them have actually made the leap, escaping London's stable-but-boring jobs in favour of the alluring pastures of the sub-continent. For long-term expats like me, 6 per cent GDP growth a bad year, a stable democracy, limitless human intellectual capital and a financially empowered middle class of more than 300m people far outweigh worries about bureaucracy, corruption and inefficiency. I left the UK in 2001 to work for a private equity fund in California, and based in South Korea for about a month in 2003 working on an initial public offering before arriving in India.

I don't know where the World Bank gets its data that put India 169th out of 183 countries for "ease of starting a business". I recently started my fourth Indian company, Pugal Advisors, as an investment and special situations advisory firm. The whole process took a bristless two days, as opposed to the bank's claims of 30 average.

Having said that, I do encounter a few problems with setting up an offshore holding company in Mauritius. India has a treaty with the island state that means you pay low taxes if your company is set up there.

New regulations have created a forest of "Know-Your-Client" requirements, including

### The public

**Ad deconstruction**  
Guinness's TV ad



**Client:** Diageo  
**Agency:** AMV BBDO  
**Territory:** Global  
**Verdict:** ★★★★★

Guinness has stood by its tagline "Good things come to those who wait" for 10 years. However, it was deemed to make the drink seem too exclusive, leading it to a Sunday-afternoon feel.

Never lacking in scope ambition, its new 90-sec high-definition television cinema advert was filmed in Canada, Fiji, New Zealand and England, using Hollywood set designers' top photographers.

A man fires a rocket in the clouds, creating rain. He is released into a barren ocean. Turf is hauled over scorched mountains and



**'We have 35 criteria when deciding on the location'**