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Have we all got our heads in the cloud over data disasters?

Global IT workloads have migrated to a vast network, but what happens if there's a glitch, asks *Tom Hoggins*

It was the day the internet suffered a meltdown. On an otherwise quiet Sunday last month, Snapchat failed, YouTube crashed and millions of Gmail users were left unable to log on to see their emails.

The chaos also spilt over into the "real world". Some smart products connected to the cloud, including Nest cameras, baby monitors and thermostats, ceased working.

"Maybe the 'connected' home and 'cloud' living isn't so great after all," wrote one Twitter user. "Some Nest users couldn't unlock doors."

The cause? An outage in Google Cloud that stemmed from a maintenance update that was "incorrectly applied to a larger number of servers".

The glitch cast a fresh spotlight on how much we depend on cloud services for simple tasks like watching videos and locking the door.

These meltdowns are becoming all too common – and the cause is often something simple. In February 2017, for instance, a team at the North Virginia data centre of Amazon Web Services were performing routine maintenance when an engineer mistyped a command, shutting down more servers than intended. That simple mistake had a domino effect on Amazon's cloud services, causing widespread havoc online.

Amazon estimates that around 3pc of all the IT workloads out there today are held in the cloud. The potential to increase that number is huge – raising the risk of a catastrophic failure.

"There is a real potential for crippling outages that affect a number of business-critical services," says Matt Walmsley, a director at security firm Vectra. There is an almost mythical obfuscation behind "the cloud". The reality is a lot less nebulous: the cloud is essentially a network of data centres owned by providers – such as Amazon, Microsoft and Google – that allow businesses to "rent out" computing power and data storage as needed.

The industry is set to be worth an estimated $214bn (£176bn) this year. That figure is expected to increase to $331bn by 2022, as more services and

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institutions move their computing to a cloud service.

In business, the cloud has become a great equaliser, with start-ups able to use it to compete with more established institutions. It is scalable, allowing users to easily expand or decrease their use depending on their needs. And any upgrades to the system provided by Amazon, Microsoft and others will be available to customers.

Perhaps most importantly, in the majority of cases, using the cloud is safer for continuity in the event of a disaster than local storage. Back-ups of data are spread between centres and a failure at one will almost always mean switching seamlessly to another site.

Netflix, which uses AWS, runs simulated outages to make sure its streaming service is back online almost instantaneously in the event of a localised failure.

"These big cloud providers have already been achieving the coveted five nines for several years," says Prof Mark Skilton, a digital and telecommunications expert from Warwick Business School. "That means they have measures in place to ensure they are up 99.999pc of the time."

There has been recent concern raised over that 0.001pc and the increasing "centralisation" of our data. AWS currently holds 47pc of the market, with Microsoft's Azure behind with 11pc. Amazon's dominance is slowing somewhat as other major players commit to the cause. Microsoft's share is up, as is Alibaba's (8pc) and Google's (7pc).

This leaves the industry dominated by a handful of the world's biggest technology companies, with an unprecedented control of information.

According to a joint-report by Lloyd's of London and the American Institutes of Research (AIR), a "cyber-incident" impacting just one of the top three public cloud providers in the US for three to six days, could result in losses of $19bn. Only $1.1 to $3.5bn of that would be insured.

"The biggest danger is that all of the data centres in a cloud might fail due to a catastrophic software error. If one was to completely fail then a high proportion of the world's applications would fail," says Dr Paul Watson, professor of computer science at Newcastle University.

This modernisation of information technology is already well under way; more than 2,000 government agencies use Amazon Web Services (AWS), Nasa utilises multiple cloud services, while the NHS is in the process of moving much of its IT use to the cloud.

A report from three of the EU's financial watchdogs in April said that reliance on cloud services was an "acute" concern for financial stability and recommended legislation that would provide more oversight to the safeguards in place.

One of the Bank of England's chief policymakers, Anil Kashyap, also raised concerns that a cyber attack on British financial institutions was "inevitable" and that the over-reliance on a handful of cloud providers could leave banks vulnerable.

Amazon and Microsoft insist they are taking the responsibility seriously.

"For us, security is unquestionably the number-one priority," AWS boss Andy Jassy told *The Daily Telegraph*. "Because when you have government organisations or enterprises with mission critical data, and operations that really change people's lives if they don't work, you must have a platform that's highly secure." Microsoft said that it believes "the key to successful cloud adoption will be a tight partnership between regulators and cloud providers to ensure that the right frameworks, programs and processes are in place".

That also isn't to say that breaches and outages do not happen and will not happen in the future. Amazon says that it has never seen an entire data centre go down, but Microsoft could not claim to be so fortunate after a lightning strike knocked out a centre in San Antonio, Texas.

The risk of a more human cost could also increase. Dr Daniel Leightley of the Military Health Centre at King's College London, said: "At present, if systems go down, appointments are cancelled, records cannot be accessed and, often, NHS Trusts default to paper-based recording of events," he says. "All of which creates clear risk to the patient. The cloud offers great advantages, we're just not there yet in managing the risks."

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47pc

The share of the market that cloud provider Amazon Web Services has, Microsoft Azure has 11pc

19bn

Estimated cost in dollars if there was a cyber incident, lasting three to six days, at one of the top US providers