The Economist Intelligence Unit

An Economist Intelligence Unit research programme

Preparing for next-generation cloud:

Lessons learned and insights shared

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About this report

Preparing for next-generation cloud: Lessons learned and insights shared is an Economist Intelligence Unit (EIU) research programme, sponsored by Hitachi Data Systems. In this report, the EIU looks at companies' experiences with cloud adoption and assesses whether the technology has lived up to expectations. Where the cloud has fallen short of expectations, we set out to understand why. In cases of seamless implementation, we gather best practices from firms using the cloud successfully.

To do this, the EIU surveyed 232 global information technology (IT) executives in January–February 2015 to explore the challenges they experienced in implementing cloud technologies. Forty-three percent of the respondents are either members of their companies' boards or hold C-level positions, and over half are from organisations with global annual revenue exceeding US$500m.

In terms of regional representation, 28% are based in Western Europe and 26% each in North America and Asia-Pacific. All of the survey respondents work for organisations that use cloud computing services or infrastructure, most commonly private cloud, but also public, hybrid and, to a lesser degree, community types.

The EIU supplemented the survey results with in-depth interviews of IT executives and industry experts. We would like to thank all survey respondents, as well as the following executives (their companies listed alphabetically), for their time and insights:

Mark Tonsetic, IT practice leader, CEB

Daniel Steeves, strategist, Beyond Solutions and deRisk the Cloud

Greg Jenko, principal, Information Technology Transformation Advisory practice, EY

Bill VanCuren, chief information officer, NCR Corporation

Phil Parkin, chief information officer, TNT UK

This paper was written by Stephen Pritchard and edited by Veronica Lara.

Introduction

Over the last decade, cloud computing has transformed the market for IT services. But the journey to cloud adoption has not been without its share of twists and turns.

Although businesses have gained, both financially and in terms of agility, from moving IT to the cloud, challenges remain. These range from service outages to data losses, and in some cases, a failure of cloud services to provide the commercial benefits buyers had expected. As cloud technology evolves and usage widens, however, both vendors and buyers of IT services are increasingly addressing these challenges—and each may bear responsibility for the outcomes.

Over the past five to six years, cloud computing has matured considerably as an industry, with new suppliers and cloud service models emerging to meet business needs. These developments in the cloud market have helped overcome some of the technology's early shortcomings, especially in the areas of data protection and security.

On the buyer's side, corporate IT departments have also gained experience in dealing with cloud suppliers, and in integrating cloud capabilities into IT services that they already own and oversee. IT departments have also become more skilled at budgeting for cloud projects, ensuring that such projects adhere to corporate IT policies, and that IT works with partners—especially integrators—to extract greater value from cloud projects.

In this Economist Intelligence Unit report, sponsored by Hitachi Data Systems, we assess the experiences of companies deploying cloud services. Our study explores key challenges and risks within the context of the evolving cloud market. By gathering the lessons learned from past cloud implementations, we distil the best practices that will help business leaders make the most of their cloud opportunities. ■

1 Strong cloud growth continues

Businesses continue to move information technology (IT) workloads to the cloud, both as an alternative to in-house computing and to conventional outsourcing.

Cloud computing is now an established way of delivering IT services, but also one with much potential to grow. A study by Goldman Sachs, a US investment bank, expects cloud IT spending to grow by 30% (on a compound annual growth rate basis) between 2013 and 2018, against 5% for IT spending overall.[1] A separate study by Gartner, a US-based research and advisory firm, suggests that the bulk of new IT spending will be in the cloud by 2016.[2]

Adoption of cloud services has accelerated over the last few years, not least because cloud solutions have matured, more suppliers have entered the markets, security measures have improved and prices have fallen. As a result, the range of IT tasks and business processes suitable for the cloud has broadened significantly in recent years. Companies today use a range of commercial models for the cloud:

- Public cloud (runs as a pay-as-you-go service for multiple business customers, exists off the premises of the customer firm);
- Private cloud (dedicated to just one business, may exist on or off premises);
- Community cloud (shared among a group of organisations, often from one sector of business, may exist on or off premises); and
- Hybrid cloud (a combination of public, private and/or community clouds).[3]

"We see companies moving to more mature cloud providers, including the application providers, to connect more of their business capabilities to the cloud, rather than just buying computer capacity," says Greg Jenko, a principal in the IT practice at US-based EY.

The cloud's changing formations

The survey revealed five leading uses of the cloud:

- Web hosting (61%);
- File storage (59%);
- Business applications (59%);
- E-mail (47%); and
- Desktop applications (44%).

Businesses are also moving more complex IT workloads to the cloud. In the early days of cloud technology, companies bought raw IT capacity (basic server or storage space) to build

1 Columbus, Louis. "Roundup of Cloud Computing Forecasts and Market Estimates, 2015." Forbes, January 24th 2015. http://www.forbes.com/sites/louiscolumbus/2015/01/24/roundup-of-cloud-computing-forecasts-and-market-estimates-2015/

2 "Gartner says Worldwide IT Spending on Pace to Grow 2.4% in 2015." Gartner, January 12th 2015. http://www.gartner.com/newsroom/id/2959717

3 Mell, Peter; Grance, Timothy. "The NIST Definition of Cloud Computing." National Institute of Standards and Technology, September 2011. http://csrc.nist.gov/publications/nistpubs/800-145/SP800-145.pdf

Which of the following were business objectives for your cloud deployment?
Please select all that apply.
(% respondents)

Source: Economist Intelligence Unit survey, January–February 2015.

applications. Now they are more likely to buy comprehensive, cloud-based applications, or even complete business processes, such as talent management for human resources.

Frequently these cloud-based services replace customised or in-house developed applications, especially where a good "off-the-shelf" option exists in the cloud. "The speed of deployment improves if you deploy applications in the cloud without too much customisation," says Phil Parkin, chief information officer (CIO) at TNT UK, a courier business. "The more you customise an application, the more you lose the ability to apply new features as they are released," he says.

The survey indicates that the business objectives served by cloud computing are many and varied. At least half of survey respondents cite higher availability, controlling costs or employee efficiency among their reasons for deploying the cloud.

Firms are also turning to the cloud for greater scalability. Cloud providers enjoy economies of scale in terms of infrastructure management, and security that individual businesses may not be able to match. Mr Jenko notes, "Cost is one [factor] and scalability is another…it is cheaper and easier administratively to add capacity to the cloud."

Improved agility—the ability to respond more quickly to market developments—is another key motivator for businesses to adopt the cloud. "Among large enterprises, those companies that indicate cost efficiency is their number-one priority show the slowest migration path to the cloud," says Mark Tonsetic, IT practice leader. "If you look at organisations whose priority is speed to market, they are moving to the cloud more quickly. And they are moving more assets to the cloud."

Towards a more secure cloud

Cloud computing vendors have addressed some of enterprises' key objections to the cloud, including security, where data are stored and data protection. It is now possible to choose providers that meet specific security or regulatory requirements, including international requirements such as PCI-DSS (Payment Card Industry Data Security Standard) for handling credit-, debit- and cash-card transactions. Cloud vendors have also improved compliance with regulations such as—in the US—the Health Insurance Portability and Accountability Act (HIPAA) in healthcare and the Dodd Frank regulations in finance.

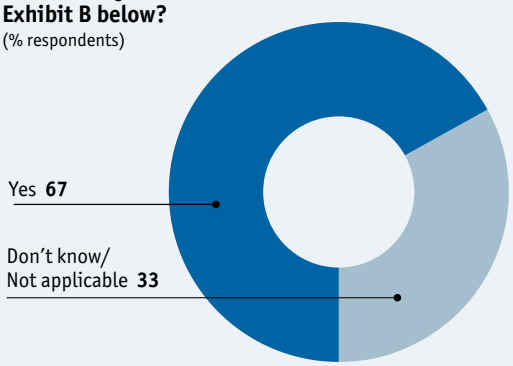
"Cloud has permeated through the technology landscape and affects how we think about future opportunities, as well as operational efficiency," says Bill VanCuren, CIO at NCR Corporation, a US-based software, hardware and services company. "We were an early adopter of cloud five to six years ago, when we started to use public cloud or SaaS [Software as a Service] for speed and agility," he adds. But there are circumstances where the company uses other clouds too: "Hybrid [cloud] is a toolset we work with to integrate security and data management." ■

2 Adventures working in the cloud

Serious failure of a cloud implementation is a significant but relatively infrequent event. And yet...

When asked for the causes behind failed cloud implementations, executives are as likely to cite errors on the part of their own organisations as they are supplier-related failures.

Exhibit A
Have any of your cloud computing implementations suffered any of the incidents or issues listed in Exhibit B below?
(% respondents)

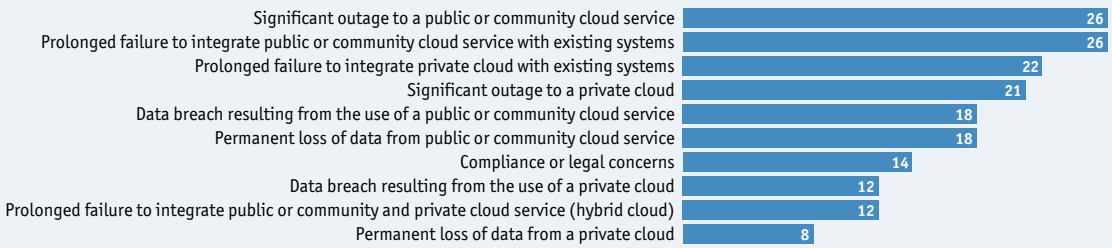


The "Yes" percentage represents the sum of respondents listing at least one of the 10 incidents (or "other") in the chart below.
Source: Economist Intelligence Unit survey, January–February 2015.

In recent years, organisations have built up extensive experience in managing and optimising their cloud deployments. Despite early fears around the safety and security of cloud infrastructure, cloud computing does not appear to be especially risky, or at least not significantly riskier than other models of IT sourcing and deployment. In fact, a third of survey respondents say they are unaware of any failures in the cloud infrastructure they use. Still, a majority (67%) indicate they have experienced some problems, such as outages and integration failures.

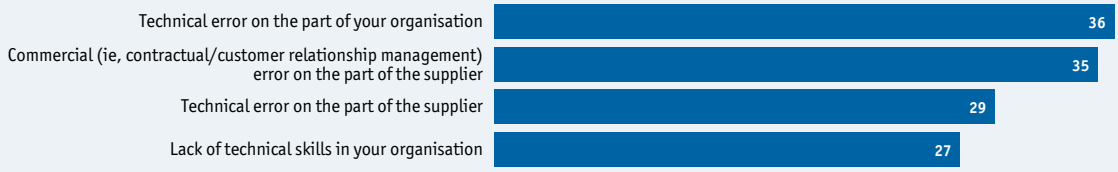
Quite tellingly, when asked for the causes behind failed cloud implementations, executives are as likely to cite errors on the part of their own organisations as they are supplier-related failures. Technical errors are more commonly caused by the user organisation (36%) than by the supplier (29%). Notably, commercial errors are the most common type of supplier failure.

Exhibit B
Have any of your cloud computing implementations suffered any of the following incidents or issues related to cloud computing?
Please select all that apply.
(% of respondents who have suffered an incident)



Source: Economist Intelligence Unit survey, January–February 2015.

What were the primary causes of this incident?
Please select three.
(% respondents)



Source: Economist Intelligence Unit survey, January–February 2015.

Technical challenges, skills shortfalls

According to the survey data, firms using public cloud services are more likely to report technical failures than those using the private cloud. Among respondents who experienced a failure, the most damaging incidents are reported for public or community cloud services, including significant outages (23%), failure to integrate with existing systems (20%) and data breaches (17%). Most of these incidents involved public clouds, since the number of respondents reporting use of community clouds is small. Comparable incidents with private cloud are much less frequent, each reported by less than 10% of respondents.

However, it would be misleading to state that public cloud is always riskier. Public cloud services predate private cloud. In the early days of the cloud, users may have experienced greater security issues since the technology was not yet mature and because of their own inexperience. Conversely, the bespoke nature of private clouds allows for a greater level of security, though with possibly higher initial costs.

Based on the survey findings, technical problems with cloud deployments are more likely to stem from the organisation buying the cloud service (36% against 29%), pointing to a lack of skills or experience with cloud technology. Survey respondents believe that technical issues are exacerbated, if not caused, by a lack of skilled staff, and a lack of business-continuity and disaster-recovery planning.

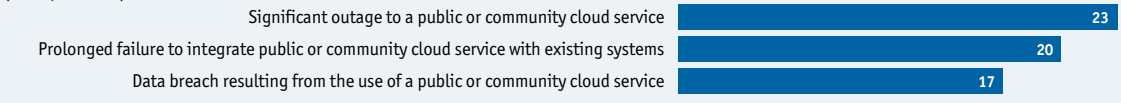
Many of these technical problems can be avoided or mitigated by better supplier selection (as we discuss below) and improved skills and practices in IT departments charged with managing the cloud. "We have become much more stringent in our selection criteria," says Mr VanCuren of NCR. "And public cloud has become more mature, although there are still areas, including classes of customer data or our own intellectual property, which we keep on premises."

Tackling the commercial challenges

Survey respondents are more likely to attribute commercial errors, rather than technical ones, to suppliers. Although the survey does not break out the specific nature of commercial failures, it points to issues that can shake firms' confidence in the cloud. These risks include losing revenue, incurring additional costs and failing to earn the expected return on investment (ROI) of cloud projects.

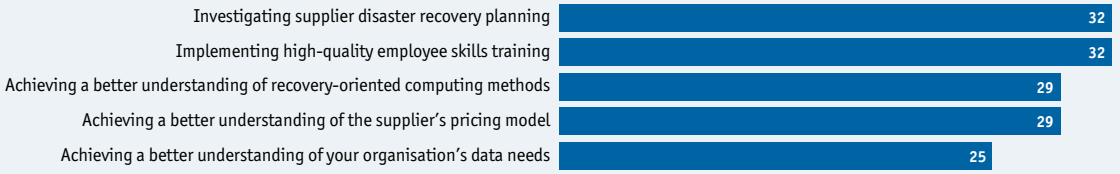
"There is pressure coming from above to save money and reduce resource requirements in IT," says Daniel Steeves, a strategist at Beyond

Which cloud computing-related incident was most damaging to your organisation?
Please select one.
(% respondents)



Source: Economist Intelligence Unit survey, January–February 2015.

What measures could your organisation have undertaken to avoid this incident?
Please select up to three.
(% respondents)



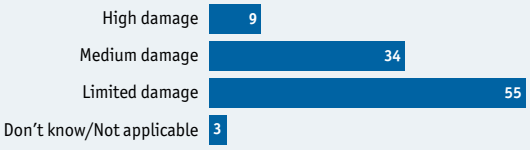
Source: Economist Intelligence Unit survey, January–February 2015.

Solutions and deRisk the Cloud, a UK-based IT advisory firm. "But there is always an element of timing. If you are in the middle of an existing three- to five-year [non-cloud] IT contract, you can't always easily walk away from it and, if you do, you won't get the ROI from the cloud that you have predicted."

Cloud projects will also struggle unless the business clarifies what it requires from the technology. IT departments need to help business leaders understand those requirements, and then translate them into technical and commercial criteria used to select cloud providers. It is not enough for the cloud service to meet the IT department's rules, although that is important. The business unit must also approve the plans. "Your stakeholders [across the business] need to sign off on what IT is trying to deliver," says Mr Steeves.

Robust service level agreements (SLAs) are thus critical to preventing problems with the cloud, as they will detail indicators measuring performance, eg, the percentage of time the service is online, and if it fails, how quickly it can be fixed.

Please indicate how damaging this incident was.
(% respondents)



Source: Economist Intelligence Unit survey, January–February 2015.

Serious failures prove rare

The survey indicates that cloud failures, when they occur, are rarely catastrophic. Only 9% of respondents that experienced a cloud incident rate damages as "high", whereas 55% and 34%, respectively, assess them as "limited" and "medium".

The biggest risks of a failed cloud implementation, according to the survey, concern the impact on customers and financial losses. Executives especially fear the loss of customer data (46%), while breach of customer privacy is cited by 36%. Financial risks include loss of revenue (40%) and extra costs (32%), as well as failure of the cloud project to earn its expected ROI (17%). Respondents also cite reputational damage, legal proceedings and regulatory fines as risks.

What do you consider the biggest risks to your organisation of a failed cloud implementation?
Please select all that apply.
(% respondents)

Source: Economist Intelligence Unit survey, January–February 2015.

Regulatory and legal risk

Although regulatory risk did not rank as a primary concern among survey respondents, it remains especially important to business leaders with operations in Europe. The EU, for example, is working on new data-protection laws, which if passed in their current form as of April 2015 could lead to businesses facing fines of up to 5% of worldwide turnover (revenues) for a data breach.

Mr Jenko of EY highlights regulatory and legal risks. He cautions, "Governance issues, auditability, as well as user authentication and controls are all areas that can go wrong." He adds, "CIOs have a good handle on this in their own data centres, but these points are not always considered when services are pushed out [to the cloud]."

Despite the risks, the relatively low rates of cloud failure reflected in the survey suggest that businesses are using cloud computing to their advantage. In the time the cloud has become a go-to technology for firms, not only has it evolved, but early experiences have paved the way for best practices. ■

> "Governance issues, auditability, as well as user authentication and controls are all areas that can go wrong."
>
> Greg Jenko, principal, Information Technology Transformation Advisory practice, EY

3 Building on better clouds

Cloud technologies have matured, and early experiences are not necessarily indicative of how the cloud works today.

Cloud computing, along with all enterprise IT, is not static. As cloud technology has matured, providers have gained valuable experience in addressing the needs of businesses. Beyond established software companies, there are also a wider range of suppliers servicing the market, including cloud computing arms of enterprise IT vendors and IT integrators, as well as enterprise-scale data centre and hosting operators.

In particular, the growth of private cloud options is proving an attractive alternative—both to in-house IT or conventional outsourcing—and to the public cloud. Customers with highly sensitive data may have relied on in-house IT capabilities, avoiding the cloud altogether. But now they have a more viable option through the private cloud, not least because firms can specify their own security and data-protection measures.

Following early ventures into the cloud, businesses are scrutinising suppliers more closely and implementing better selection processes. Firms have become more cautious in their purchasing overall, as they tackle the problem of "shadow IT" (ie, services bought by staff or business units, without involving IT). IT divisions will usually have a better understanding of security, data privacy, integration and service levels. Some initial, negative experiences with the cloud have strengthened the CIO's hand when it comes to applying those standards to control shadow IT. Company boards are also more aware of the risks associated with data loss.

> "The key driver for the cloud is to satisfy the speed to market and agility expectations coming from the enterprise."
>
> Mark Tonsetic,
> IT practice leader, CEB

Balancing cost and performance

CIOs and IT experts interviewed for this report say that business managers now better understand the savings possible through the cloud, as well as the costs associated with tasks such as integration. They also understand that moving to the cloud will not automatically reduce spending on internal IT systems.

Although some firms (29%) report that they could have avoided a negative cloud incident by achieving a better understanding of the supplier's pricing model, interviewees also emphasise that focusing purely on cost is not the way to make the best of the cloud. "The conversation around cloud has shifted. It is not as much the cost question it used to be," notes Mr Tonsetic of CEB. "The key driver for the cloud is to satisfy the speed to market and agility expectations coming from the enterprise."

Indeed, the full cost savings from the cloud might not be possible until more, older "legacy" IT can be retired. Businesses may still need older software applications or hardware for some time, and it is easy to underestimate the costs of maintaining such systems. Those running costs

may even rise as systems age.

Businesses will thus need to allow for the costs of operating older systems, the cost of their newer cloud infrastructure and that of integrating them both. Nonetheless, rising costs associated with older IT may spur moving more tasks to the cloud, and more quickly. "IT investment has to fit into our new world of IT," says Mr Parkin of TNT UK. "We don't wish to spend money on the old IT world."

Executives surveyed are also looking beyond IT performance. The other important non-cost factor for moving to the cloud is employee efficiency, cited by 50% of respondents. This strongly suggests firms are looking to the cloud for business improvements as well.

The power of integration

IT departments have improved their ability to match cloud services with the right tasks and business processes. They have also bolstered their purchasing and integration skills. "The idea of the CIO as a 'cloud broker' is an interesting one," says Mr Parkin. "IT's role, really, splits into three: business relationships and demand management, support functions, and integration: how do we get it all to work together?"

Twenty-six percent of survey respondents who experienced a cloud incident cite a "prolonged failure to integrate" with the public cloud as a problem. But those interviewed for this report point to improved know-how, as well as better support for integration by cloud vendors, as easing this burden.

"Integration problems [in the cloud] are as much business problems as technical ones," says Mr Tonsetic. "You have to have the right conversations with business partners up front, and discover in advance what their integration needs are, [rather than] having to correct problems after the fact."

Planning for imperfections

The survey data show the importance of disaster recovery around the cloud, especially supplier disaster-recovery arrangements. "You can't ignore business-continuity planning," says EY's Mr Jenko. "You have to plan for an outage…You must put contracts in place to support the SLAs you are trying to achieve with the provider."

What separates a successful implementation from a problematic one is how technical failures and outages are reduced, mitigated and recovered from. "What I want to know is that the data centre running the cloud service is secure and auditable, and has the same resilience that my data centres have—in terms of backup, of PCI [Payment Card Industry] certification. Are data encrypted, and what encryption tools are [service providers] using?" notes Mr VanCuren of NCR.

The survey also found that companies using the cloud are investing in staff training to reduce some of the problems encountered working with the cloud. Better continuity planning is another measure companies can take to improve the success of their ventures in the cloud. ■

> "The idea of the CIO as a 'cloud broker' is an interesting one. IT's role, really, splits into three: business relationships and demand management, support functions, and integration: how do we get it all to work together?"
>
> Phil Parkin,
> chief information officer,
> TNT UK

What, if any, measures has your organisation undertaken to overcome challenges in cloud computing implementation?
Please select all that apply.
(% respondents)

Source: Economist Intelligence Unit survey, January–February 2015.

4 Transforming incidents into action for informed decision-making

> “The biggest thing is to choose the right provider, first and foremost…The next most important is to choose the right integrator.”
>
> Phil Parkin, chief information officer, TNT UK

Businesses are poised to continue investing in the cloud. But as the range of cloud services increases, firms need to adopt best practices to make the most of the opportunity the technology offers.

Business leaders using the cloud want to ensure that the technology is making their organisations more flexible, efficient and cost effective. If well managed, the cloud can be a key tool for improving business performance and IT efficiency. Adopting best practices around cloud vendor selection, cloud procurement and project management go a long way to improving cloud performance, and to increasing its viability as an alternative to other forms of IT delivery.

Of course, not every form of cloud will suit every business, or every business role. Vendor and workload (task) selection remain critical, matching cloud vehicles and suppliers to business IT requirements. “The biggest thing is to choose the right provider, first and foremost,” says Mr Parkin. “There are some cloud products that are an easy choice, and some that are closer to the edge. The next most important is to choose the right integrator.”

There is a strong correlation between cloud usage and an innovative business, according to the survey. Among firms rated by survey respondents as well above-average for innovation, 86% say their senior management places a high priority on the cloud; this compares with 68% of firms rated as average or below for innovation. ■

Conclusion

Cloud computing has matured considerably since its early days when it was a largely unproven form of IT service delivery, provided by companies that were relatively new to IT. New suppliers have entered the market, offering a wider range of services, better pricing and improved customer service. The infrastructure that supports the cloud, including networking and billing, has improved as well. Data security continues to strengthen, with better security practices among cloud providers. Also, the growing availability of private cloud allows businesses to specify their own security and data-protection measures.

Beyond the supply side, the cloud maturity of enterprise customers is also critical to the success of a cloud project. The research highlights this finding, with survey respondents more likely to blame themselves for technical errors than their suppliers. However, IT departments and businesses adopting the cloud can learn from their predecessors and apply best practices through the following:

- Improving supplier selection, by greater scrutiny of cloud providers to ensure that they meet corporate IT requirements;
- Choosing the right cloud service for the right task, especially when considering the need for greater control over security and data protection;
- Making better use of integrators to connect cloud services to existing IT infrastructure;
- Considering factors beyond costs, such as cloud's potential to improve business operations and boost employee efficiency; and
- Translating the business' requirements for IT into services that cloud providers can deliver, and by acting as "brokers" for cloud services.

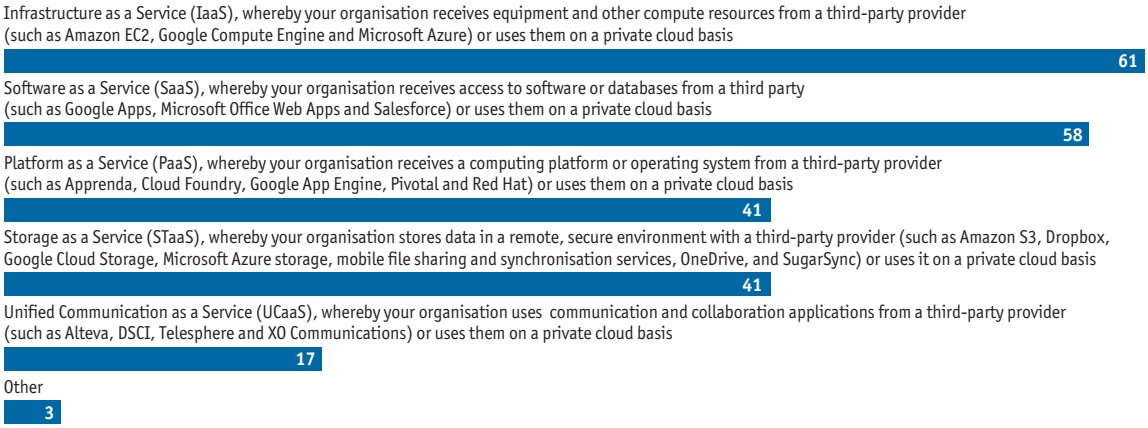
There are areas, of course, where further work can be done. Businesses are continuing to invest in training for IT skills around the cloud. They are also looking for improved disaster-recovery plans from cloud suppliers, to reduce downtime in case of failures.

Cloud computing is now a core component of the corporate IT landscape. The commercial incentives for companies to turn to the cloud—including improved business performance and legacy IT replacement—should only grow as the need becomes more pressing for enterprise IT to increase efficiency and agility. ■

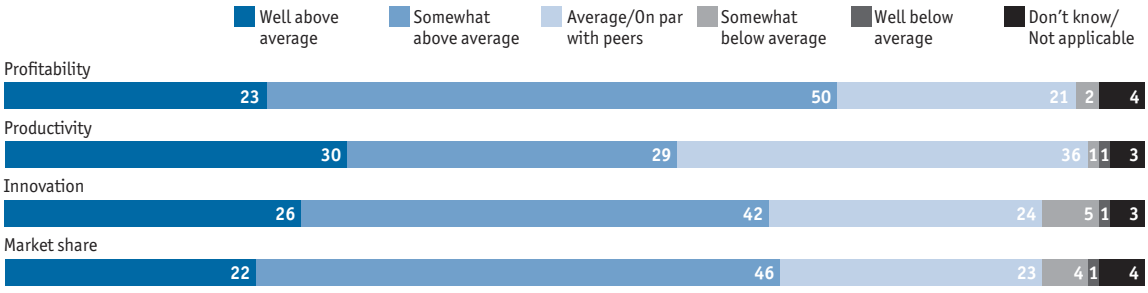
Appendix: Survey results

Percentages may not add to 100% owing to rounding or the ability of respondents to choose multiple responses.

Which of the following types of cloud computing services does your organisation use?
Please select all that apply.
(% respondents)

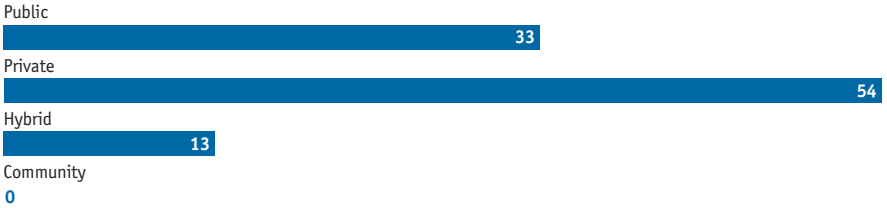


In your opinion, how effective is your organisation in each of the following performance indicators compared with its peers?
Please rate each on a scale from "well above average" to "well below average".
(% respondents)

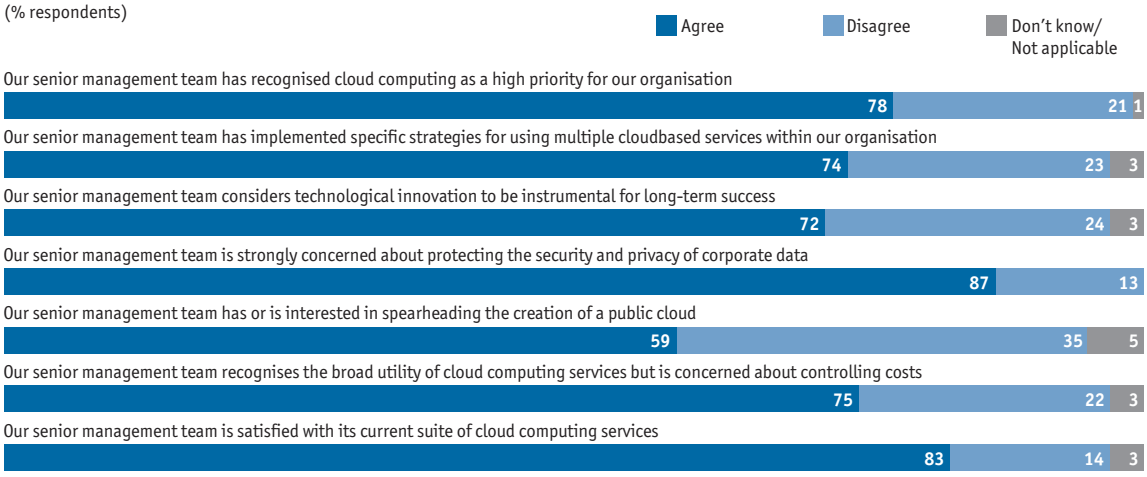


Which of the following forms best describe the type of cloud computing services used by your organisation?
Please select all that apply.
(% respondents)

You have indicated that your organisation uses more than one type of cloud computing service. Of the types you selected, which plays the most important role in your organisation?
(% respondents)

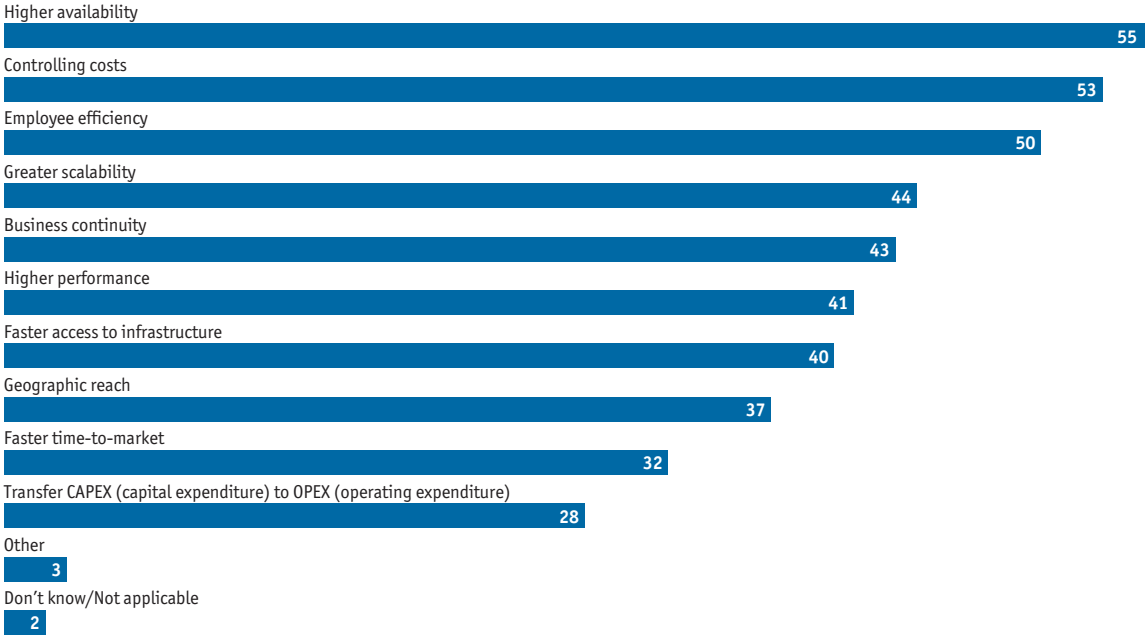


Which of the following statements regarding your organisation's strategies for cloud computing adoption do you agree or disagree with?
Please select one from each row.
(% respondents)



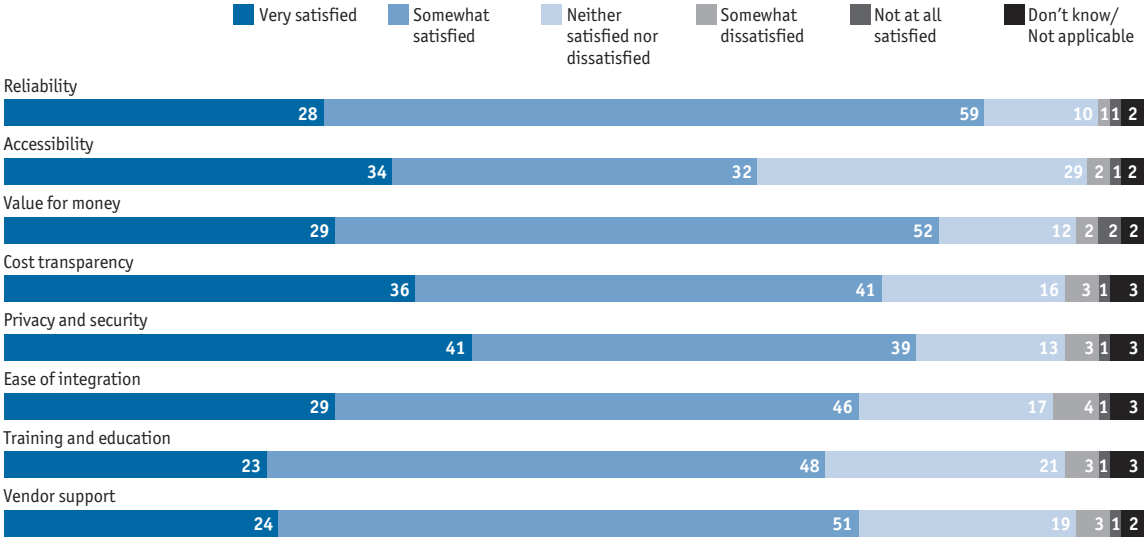
For which functions is your organisation using cloud services?
Please select all that apply.
(% respondents)

Which of the following were business objectives for your cloud deployment?
Please select all that apply.
(% respondents)



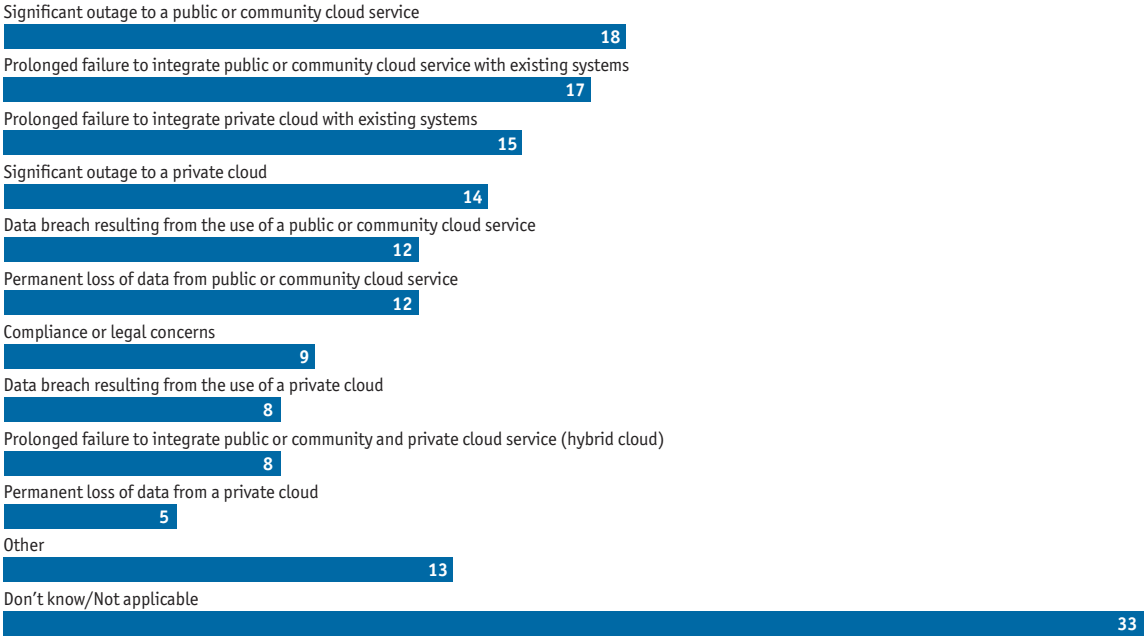
You mentioned that your organisation has used cloud computing services. How satisfied are you with the following aspects of this service?

Please rate each aspect on a scale from "very satisfied" to "not at all satisfied".
(% respondents)



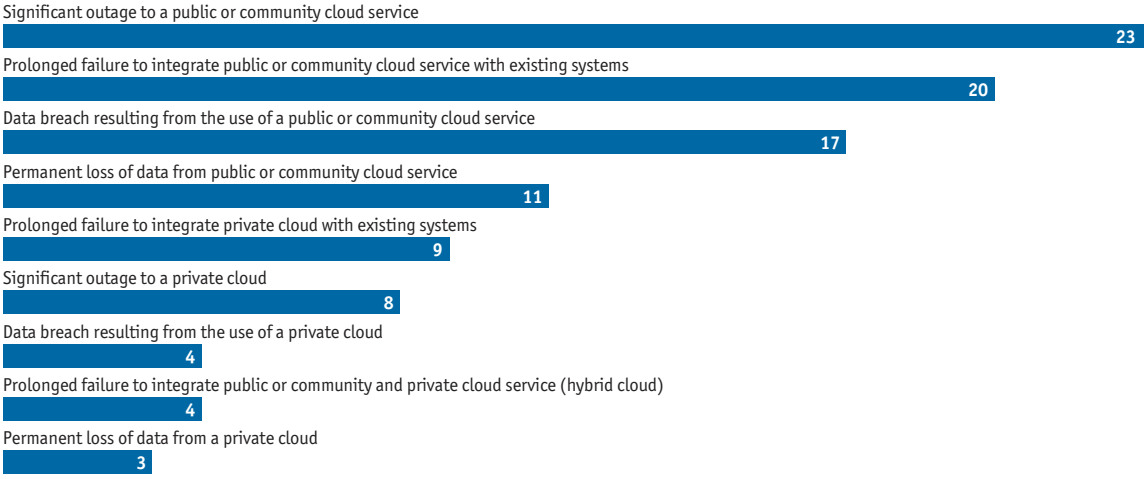
Have any of your cloud computing implementations suffered any of the following incidents or issues related to cloud computing?

Please select all that apply.
(% respondents)



Which cloud computing-related incident was most damaging to your organisation?

Please select one.
(% respondents)

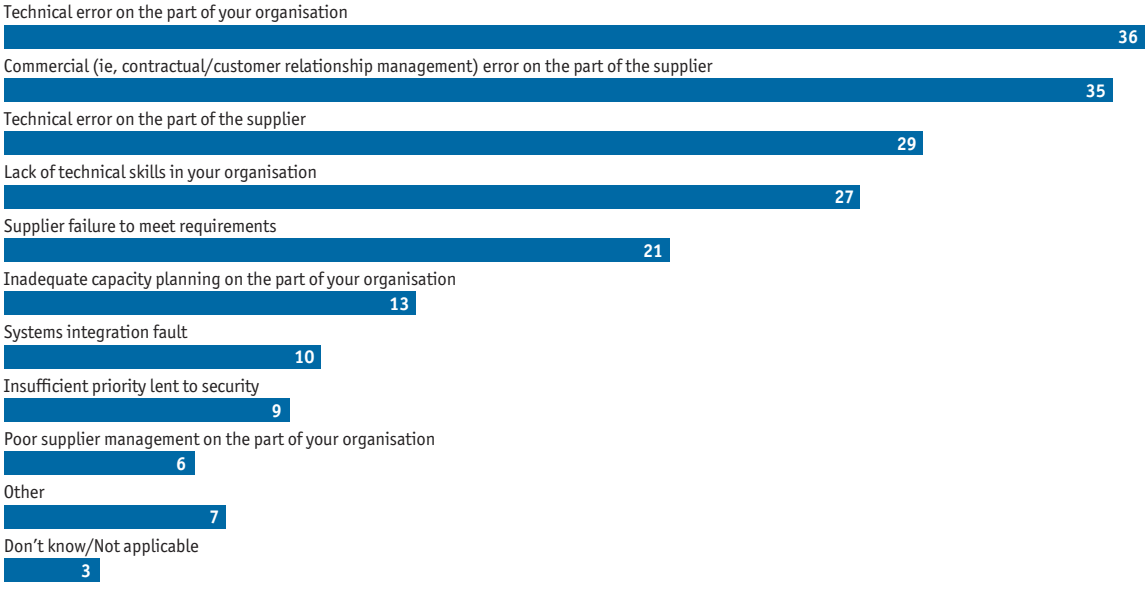


Please indicate how damaging this incident was.

(% respondents)

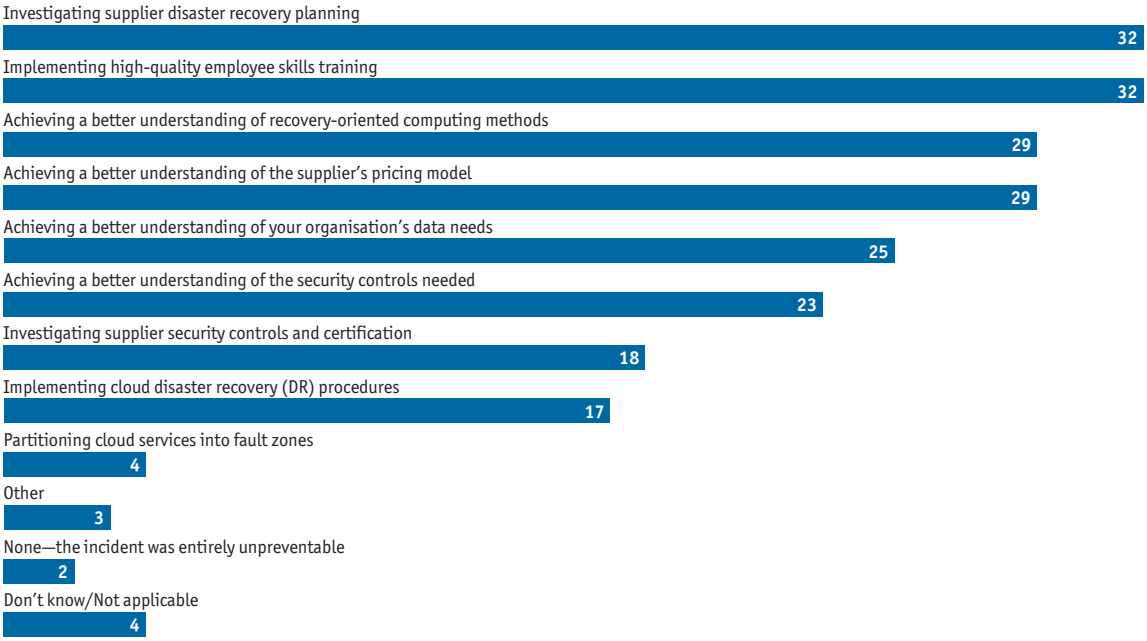
What were the primary causes of this incident?

Please select three.
(% respondents)



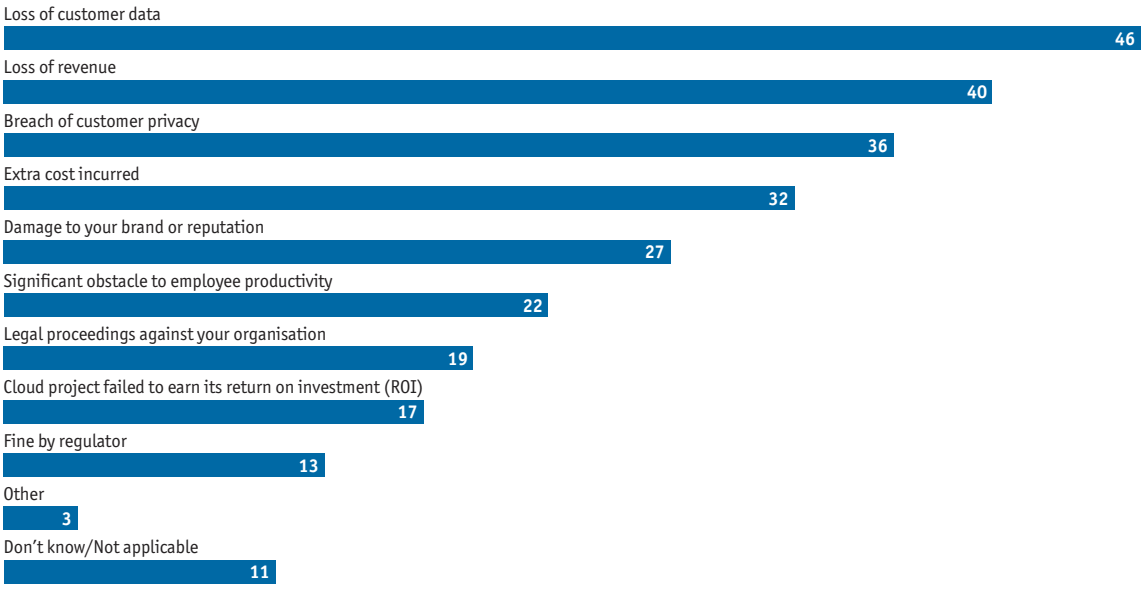
What measures could your organisation have undertaken to avoid this incident?

Please select up to three.
(% respondents)

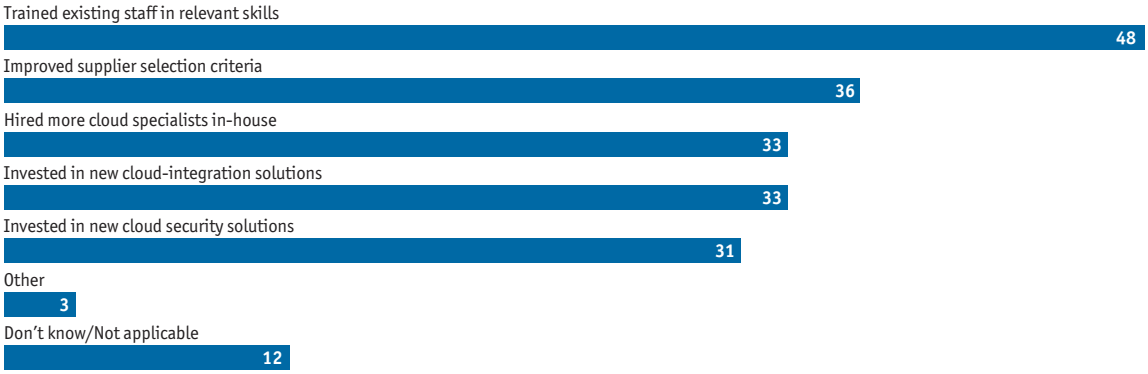


What do you consider the biggest risks to your organisation of a failed cloud implementation?

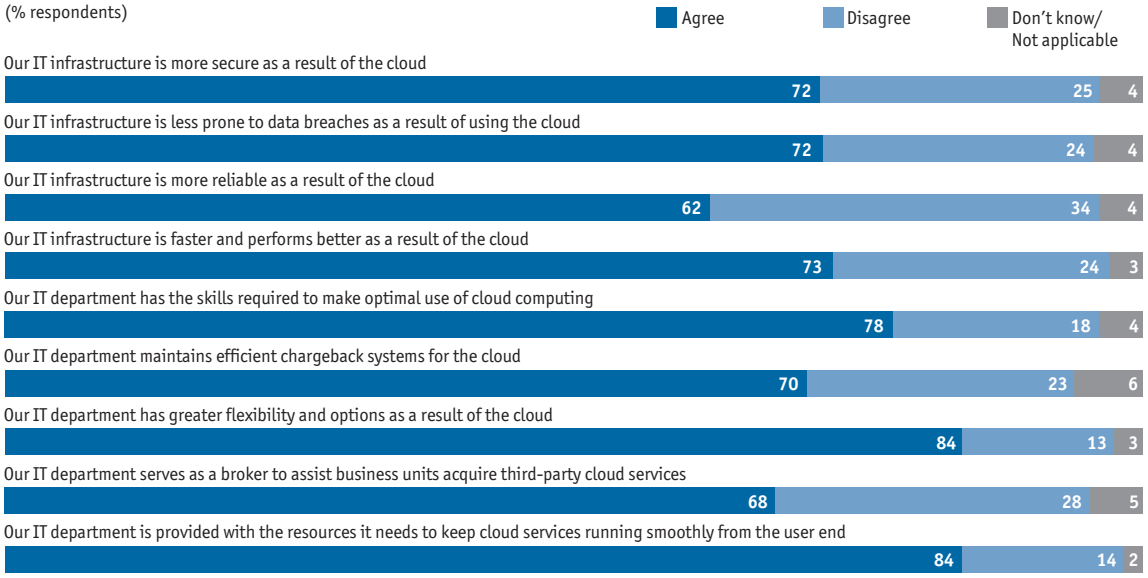
Please select all that apply.
(% respondents)



What, if any, measures has your organisation undertaken to overcome challenges in cloud computing implementation?
Please select all that apply.
(% respondents)



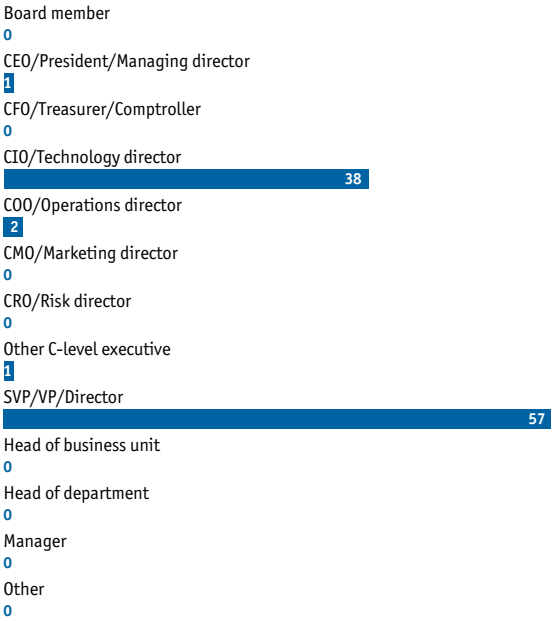
Which of the following statements regarding your organisation's IT function and its use of cloud services do you agree or disagree with?
Please select one from each row.
(% respondents)



What is your main functional role?
(% respondents)

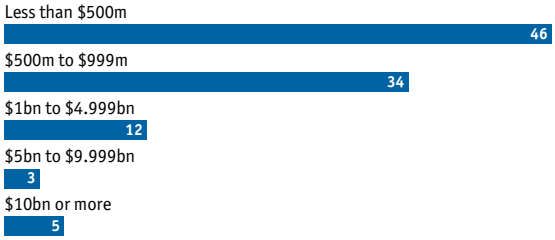
Does your organisation use cloud computing services or infrastructure?
(% respondents)

Which of the following best describes your job title?
(% respondents)

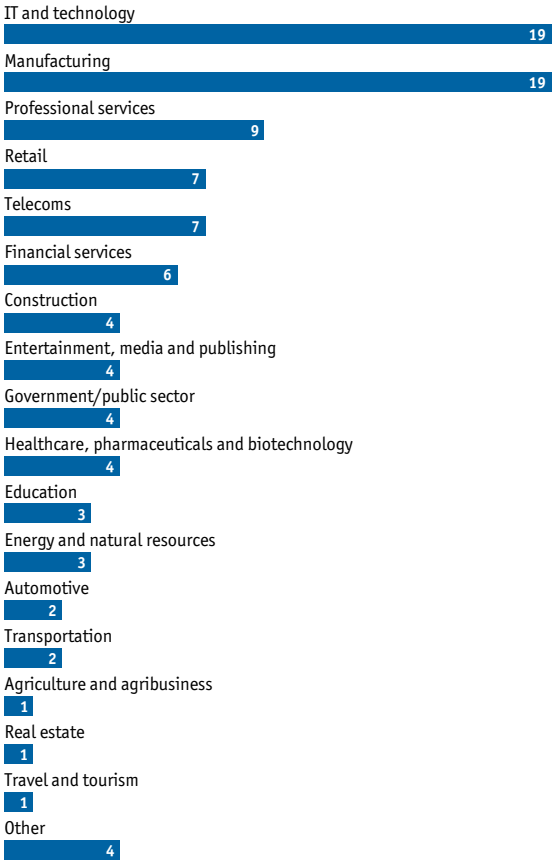


In which region are you based?
(% respondents)

What are your organisation's global annual revenues in US dollars?
(% respondents)



In what industry is your organisation primarily engaged?
(% respondents)



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