

Clinical  
Systems

Research

Administraton

# Role of Cloud in Healthcare

Independent research undertaken by Vector Consulting into public  
and private healthcare systems in Australia and New Zealand

Commissioned by Cisco

# About the study

Vector Consulting was commissioned by Cisco Australia and New Zealand to better understand the role that cloud – particularly cloud-based infrastructure – was playing in healthcare.

The study took a number of forms including desktop research, targeted interviews and a comprehensive survey, which forms the basis for this report. The survey was distributed electronically to hospitals and health systems to better understand their current cloud environments, the extent to which their requirements were being met and how they were planning for cloud in the future. The survey was in field for four weeks and all individual responses have been anonymised.

Individual providers and systems from across ANZ responded to the study.

The survey was distributed to a cross-section of private and public hospitals, health networks and systems. The responses represent a significant proportion of hospitals and beds.



## Survey responses were dominated by CIOs

Surveys were distributed to people in a range of roles; from deep technical experts to clinical and operational personnel. The majority of responses came from Chief Information Officers (CIOs).



Survey responses represented geographic spread in line with population

## A changing landscape for healthcare providers

Operating a hospital has never been more complex or challenging.

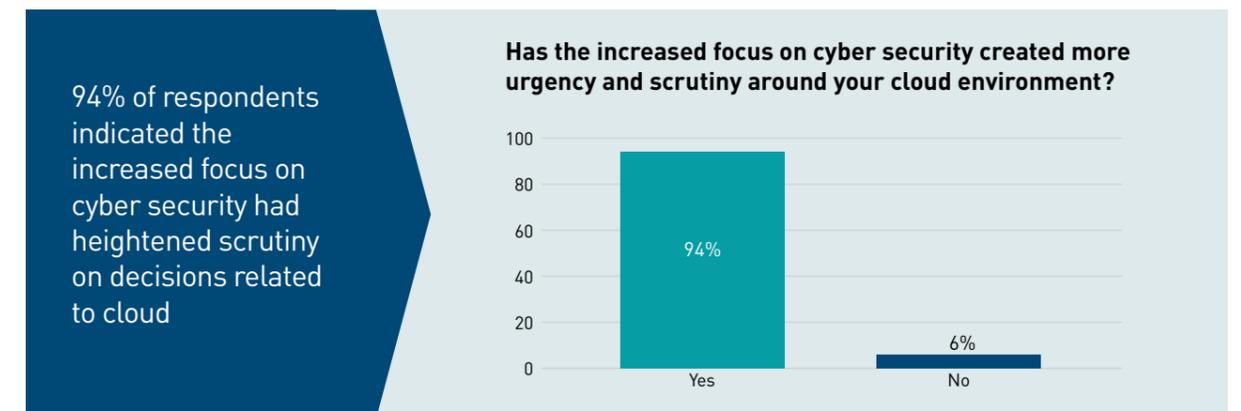
Hospital boards and executives need to manage critical clinical, regulatory and commercial risks but also deal with the profound effect of information and communication technology (ICT). The 'digitisation' of hospitals offers potential for new insights, efficiencies and improvements related to both management functions and clinical care/patient safety but it's also creating and amplifying risk.

Digitisation and innovation are increasingly seen as opportunities to attack fundamental problems and inefficiencies in both clinical and administrative processes. The health sector has a strong track record in adopting specialist clinical technologies and devices, but less so for information and communication technology (ICT) and informatics. Chief Information Officers are increasingly focused on identifying whether they have the right underlying capability to position their organisations for what's coming. This includes appropriate systems, policies, processes, talent and infrastructure.

Cloud is one of a number of technologies that is having a profound impact on the competitiveness, relevance and effectiveness of healthcare providers. The focus on cloud has come into sharper focus given the vast majority of mission-critical systems and data are hosted in clouds of one form or another.

This study revealed an even more important factor increasing the focus on cloud – cyber security.

Figure 1: The focus on cyber is materially impacting scrutiny on cloud planning and budgets



## Imperatives for institution technology

Rapid advances in technology are not only creating new opportunities for hospital digitisation, but also the prospect of more rapid and successful implementation. Developments related to the Internet of Things (IoT), big data and analytics, data visualisation, mobility and software create additional functionality but also different commercial models. In this context healthcare decision makers are increasingly focused on how to:

- Deliver high quality and continuous service to clinicians, administrative staff, patients and other stakeholders
- Maximise application performance, including business-critical legacy applications
- Improve ease of use that minimises the need for training and human interventions
- Automate and simplify the provisioning and management of technology where possible and appropriate
- De-risk deployment of new technologies and ensure ease of integration
- Secure vital assets including virtual repositories, data and systems
- Scale for growth opportunities in virtualised care and new business models.

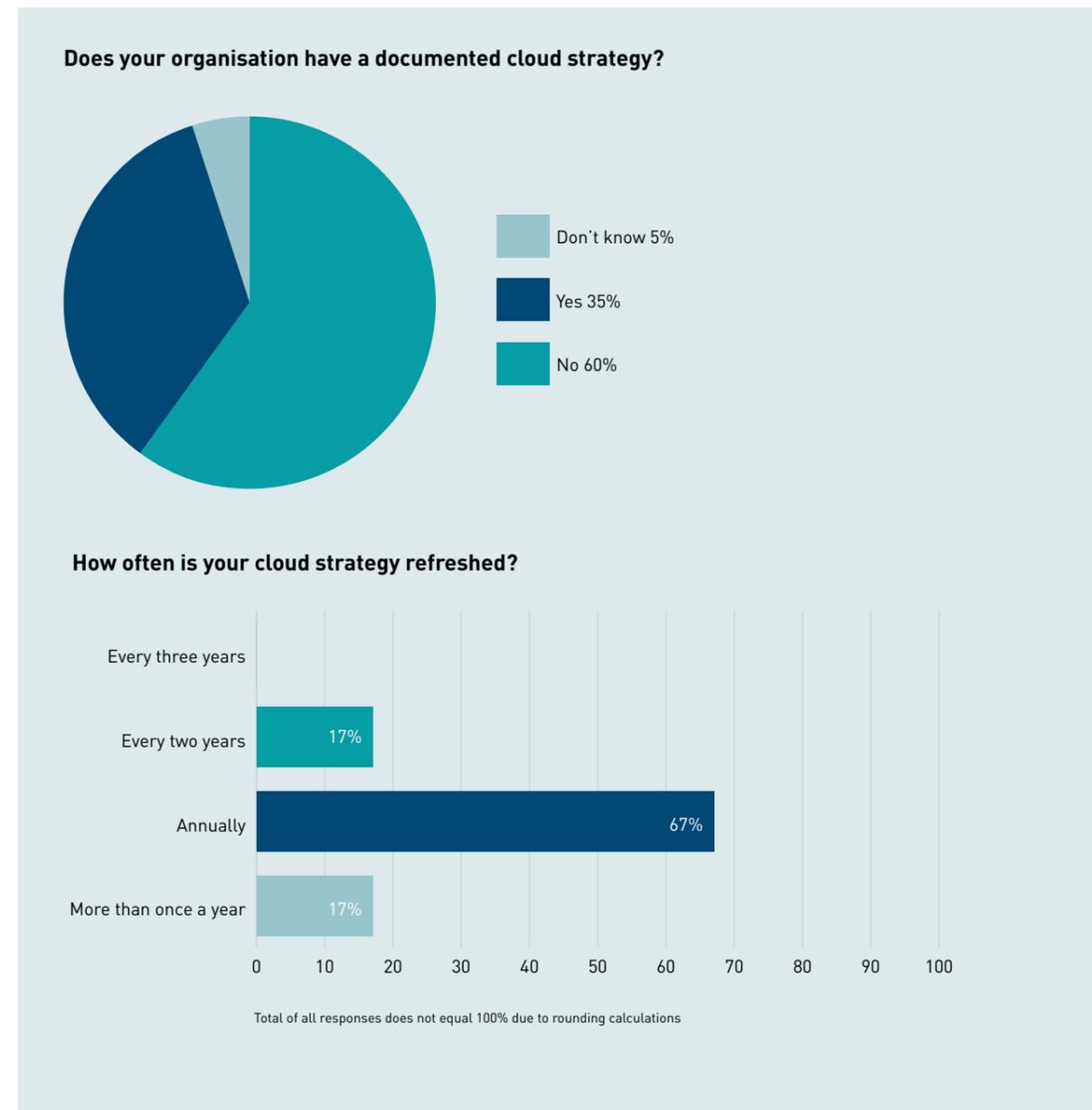
# Survey Results

## How institutions are planning for cloud

Cloud's importance and complexity has been amplified as more services are being transferred into cloud environments. While the existence of a cloud strategy does not prove anything of itself, it is a proxy for how much attention cloud receives within the broader digital / IT context. Only one-third of hospitals and healthcare providers (35%) have a cloud strategy. This compares with 93% of universities, TAFEs and polytechnics who were asked the same question.

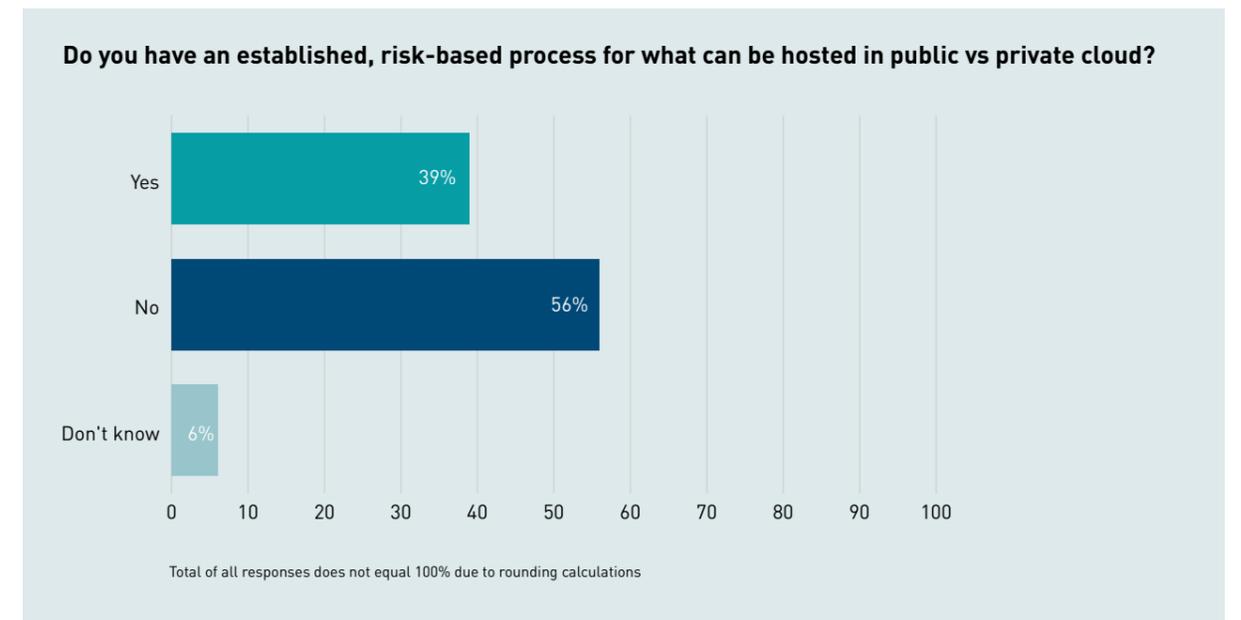
Of those that have a cloud strategy, two-thirds (67%) were committed to an annual refresh cycle while 17% updated their cloud strategies more than once a year, demonstrating how quickly cloud was evolving. At the other end of the spectrum, 17% of respondents updated their cloud strategy every two years.

Figure 2: Prevalence of cloud strategies and refresh cycle



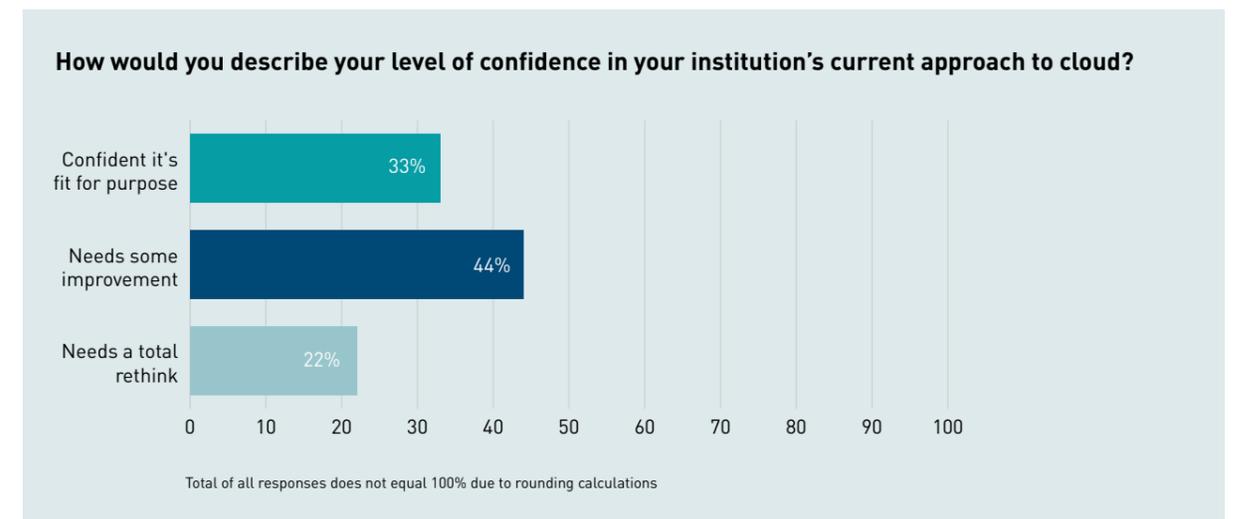
It's also telling to look at what's contained in organisation cloud strategies – or rather what's not in them. 39% of institutions had a defined criteria for what data or applications should be hosted in a private versus public cloud with a cloud strategy.

Figure 3: Criteria for public versus private cloud decisions



The existence of a cloud strategy correlated strongly with an institution's confidence in its cloud environment. However, only a third (33%) of organisations were confident in their current approach to cloud while nearly half (44%) thought their approach needed improvement and a significant 22% indicated their approach needed a total refresh. This is a vastly different picture to another technology-intensive public service – education. In that case 77% were satisfied and only 3% thought their cloud environment needed a total refresh. A number of potential explanations exist for this stark contrast including the fact that education institutions are more mature adopters of cloud generally.

Figure 4: Confidence in institute's cloud environment



## Preferred institutional cloud environments

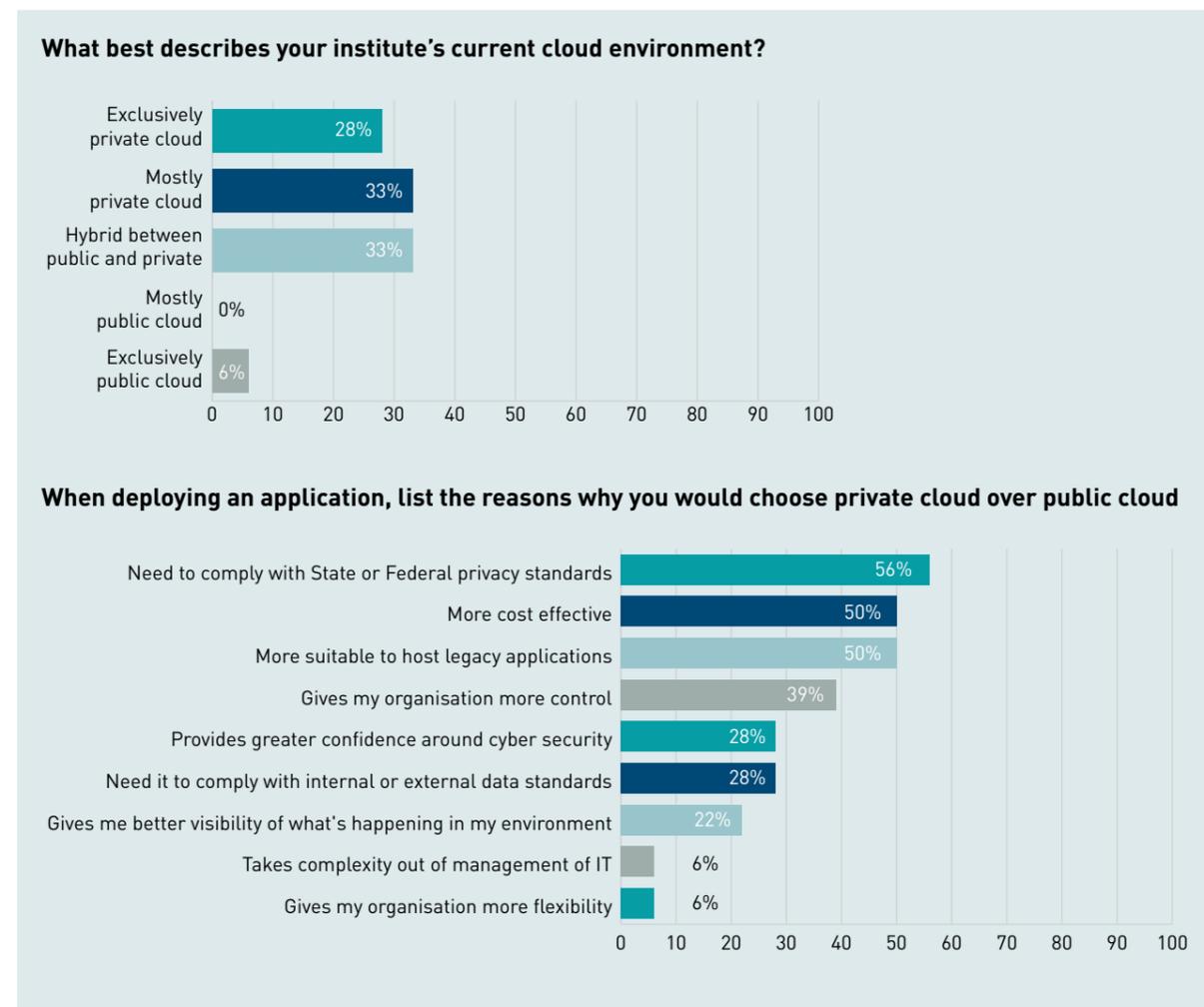
Cisco's business strategy is geared towards facilitating and supporting multi-cloud environments.

This recognises that for most organisations – education and training institutes included – the choice of public or private is not always an either / or scenario. Well over half of all healthcare – ie half of all healthcare institutions described their cloud environment as exclusively or mostly private (61%). This is not surprising given the fact hospitals need to manage a broad range of legacy applications, the scrutiny placed on data protection and extensive government reporting obligations and the fiscal environment. When asked why they would select private over public cloud there were a number of resounding sentiments (in order of preference). Private cloud was seen as:

- Needing to comply with internal or external data standards
- More cost-effective
- More suitable for hosting legacy applications.

Approximately one-third of hospitals described their cloud environment as a hybrid between public and private cloud (33%) – higher than in education – and no organisation described their environment as mostly or exclusively public.

Figure 5: Profile of cloud environments and perceived benefits of private cloud



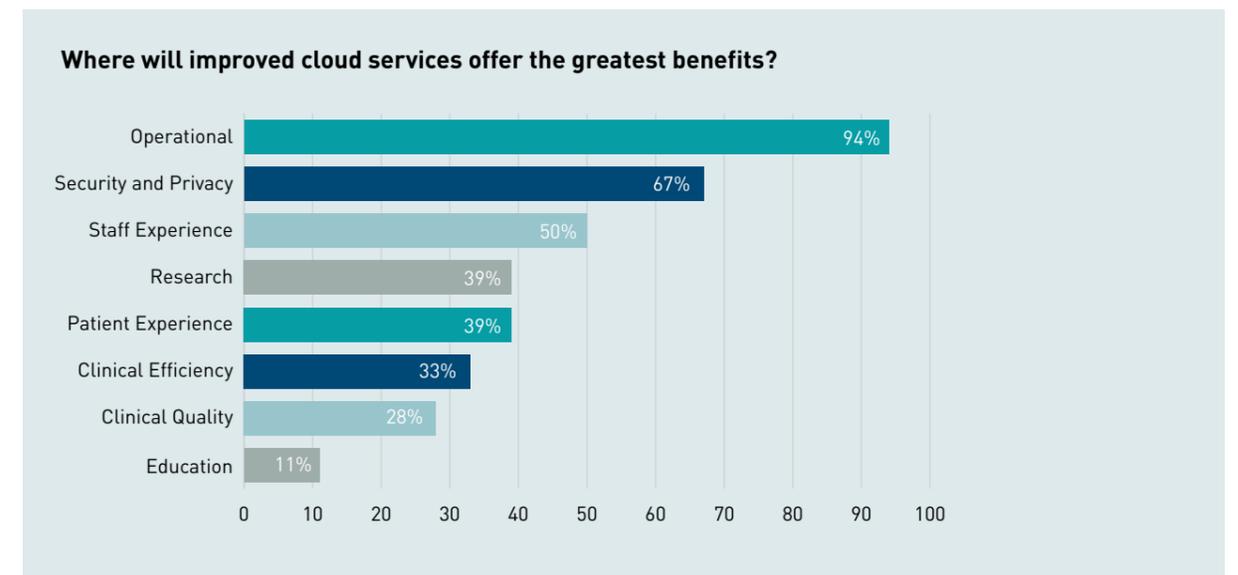
## The value of cloud to healthcare

Cloud technologies are impacting on all aspects of healthcare. One of the objectives of this study was to understand where cloud – particularly in relation to infrastructure – offered greatest value. The underlying digital infrastructure needs to support the organisation's current and future business objectives, and be 'always on, and always up'. Robust digital infrastructure is smart enough to predict and remedy potential issues, and when a system fails, a back-up is available and does not disrupt business continuity or compromise patient safety.

Future-proofed hospital infrastructure – particularly cloud – will need to support the rapid uptake of bandwidth-rich clinical applications (telehealth, digital imaging and remote monitoring), increasingly powerful Electronic Medical Record (EMR) systems and a broad range of smart services (from sensor-enabled energy, waste and building management to smart parking and lighting). The infrastructure also needs to be capable of evolving, dynamically responding to rapidly changing diagnostic and treatment technologies. An under-emphasised component of digital infrastructure relates to the tools that enable staff to access and use clinical and management data housed in databases and repositories.

As part of the survey, respondents were asked where they expected cloud to have the greatest benefits. The vast majority of respondents (94%) saw cloud offering major benefits from an operational perspective, following by benefits relating to security and privacy (nominated as a key benefit by 67% of respondents) and staff experience (50%).

Figure 6: Where cloud will have the highest impact



Specific findings in relation to specific healthcare benefits are detailed in subsequent pages.

## Value of cloud from a clinical perspective

The role of data in healthcare is a major topic of conversation. It's increasingly understood that a data-driven hospital has the ability to predict – not just monitor – its performance and make more informed decisions about interventions.

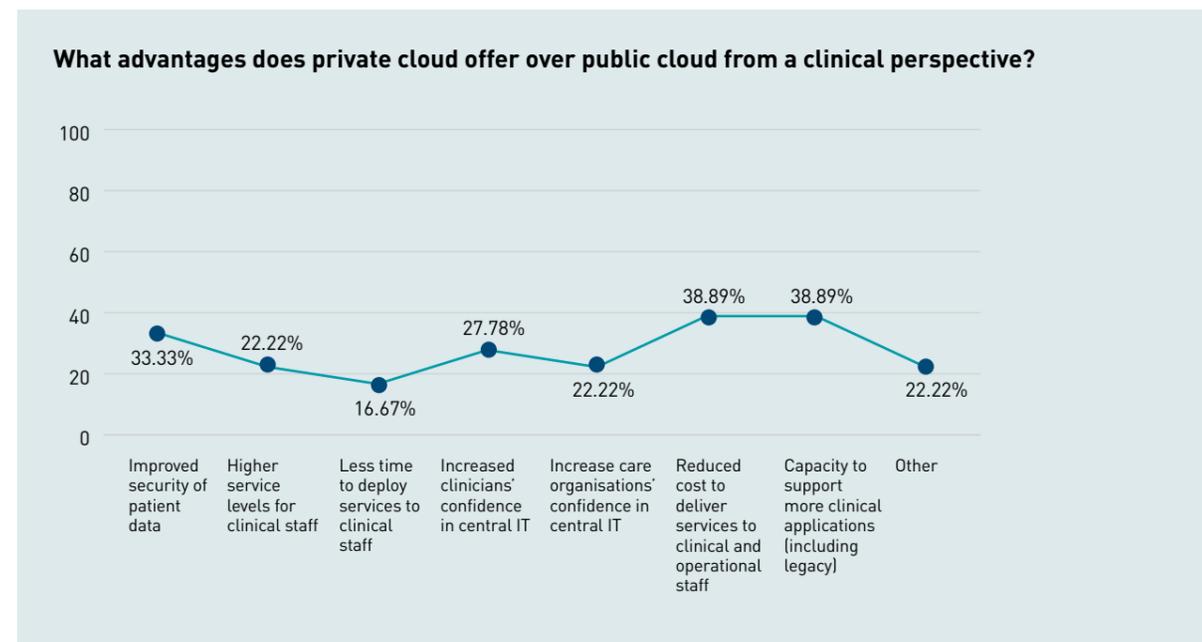
Hospitals making real-time use of data have the capacity to predict patient volumes, monitor readmissions, prevent unnecessary admissions (for chronic conditions in particular), avoid medication errors and further personalise treatment. Digitisation also has the ability to improve process coordination and patient flow, with downstream impact on both operational efficiency and patient experience. A data-driven hospital would have the capacity to interact with other healthcare providers and support patients being treated in the most appropriate setting, be that the home, acute or aged care facility.

Cloud has a major role in how data is captured, analysed, stored and presented.

Respondents were asked about the role that cloud played in teaching and learning, and specifically why there was such a strong tendency towards private cloud for infrastructure and tools related to teaching and learning. While Cisco is a multi-cloud provider, and therefore agnostic about what types of cloud are deployed, it was interested to understand the rationale for different cloud choices. Figure 7 demonstrates the major advantages of private cloud from a clinical perspective:

- Reduced cost to deliver services to clinical and operational staff (nominated by 39% of all respondents as being in the top three benefits)
- Capacity to support a greater number of clinical applications, including legacy systems (39%)
- Improved security of patient data (33%) and compliance with internal / external data standards
- Increased clinician confidence in central IT (28%).

Figure 7: Benefits of private cloud in a clinical setting



## Value of cloud for hospital administration

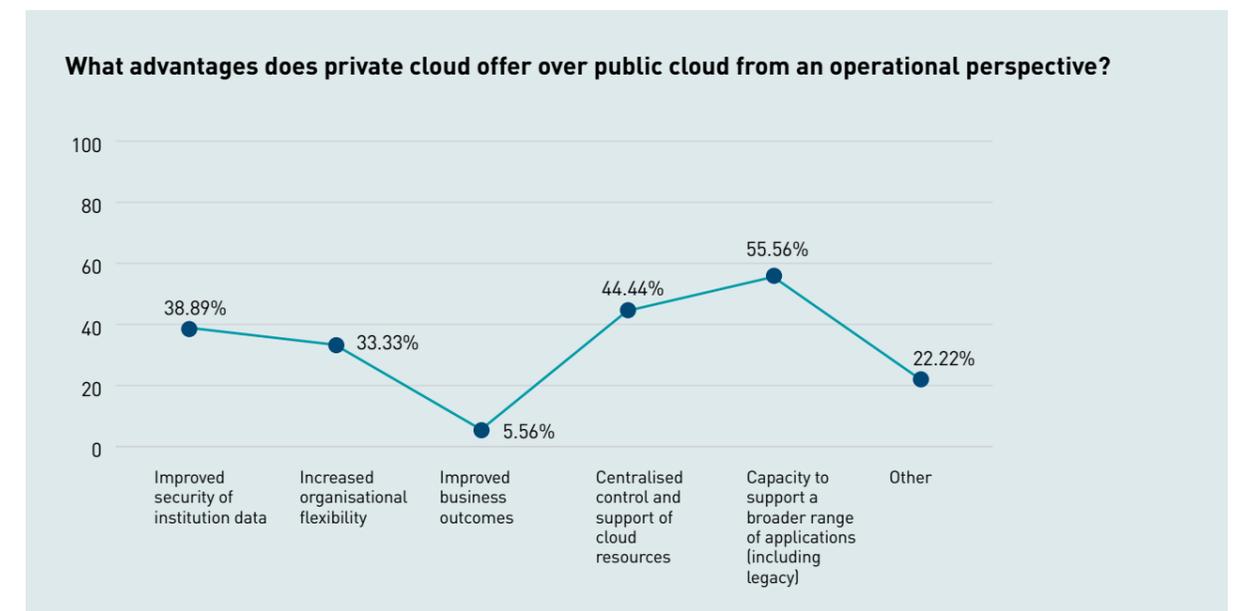
As understanding of data's value increases, and the capacity to undertake sophisticated analysis improves, hospitals will be under increased pressure to be more data-driven, not just more transparent.

This pressure is likely to come from regulators, funders and patients who increasingly expect that available technology (e.g. big data and analytics) will be fully exploited. This creates major administrative challenges, including how to build internal capability in a context of declining government funding. Hospitals will need to find ways to do more with less.

Respondents cited three major benefits from the use of private cloud for administrative functions:

- Capacity to support a broader range of applications, including legacy (56%)
- Centralised control of critical administrative data and systems and support of cloud resources (44%)
- Improved security of institution data (39%).

Figure 8: Benefits of private cloud for administrative functions in healthcare



## Value of cloud for healthcare research

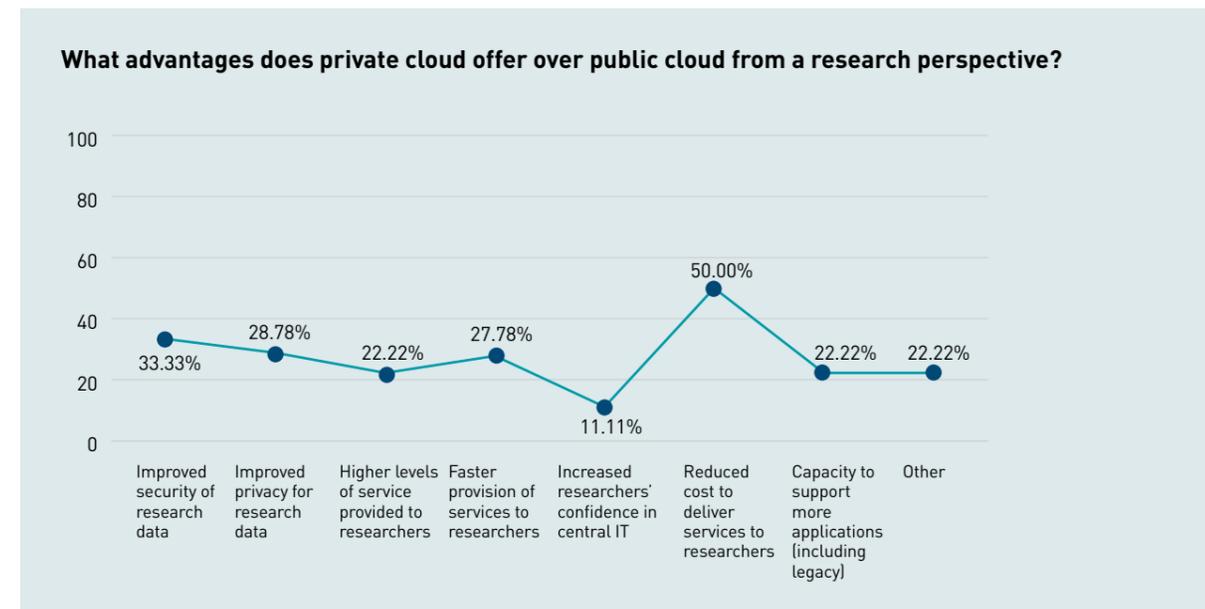
Research is a critical function within large public hospitals and meeting the demands of individual researchers and teams has become increasingly challenging.

This is driven by a number of factors, not least the sheer volume of data now available for collection and analysis. Research disciplines such as bio-informatics, genetics and quantum computing are generating unprecedented volumes of data that needs to be searchable, retrievable and – most importantly – secure. This will continue with improvements in computing power coupled with lower cost compute.

The frequently multi-disciplinary / multi-geography nature of healthcare research makes cloud a natural choice. One of the major challenges for healthcare institutions and systems is providing researchers with cloud services that are easy to consume and procure but also highly secure and cost-effective.

The bias towards private cloud is also acute in relation to research. The benefits of private cloud was dominated by cost, with half of all respondents nominating the capacity to reduce costs of delivering services to researchers as a major benefit. This was followed by improved security of research data (33%), improved privacy (28%) and faster provision of services (28%).

Figure 9: Benefits of private cloud in research

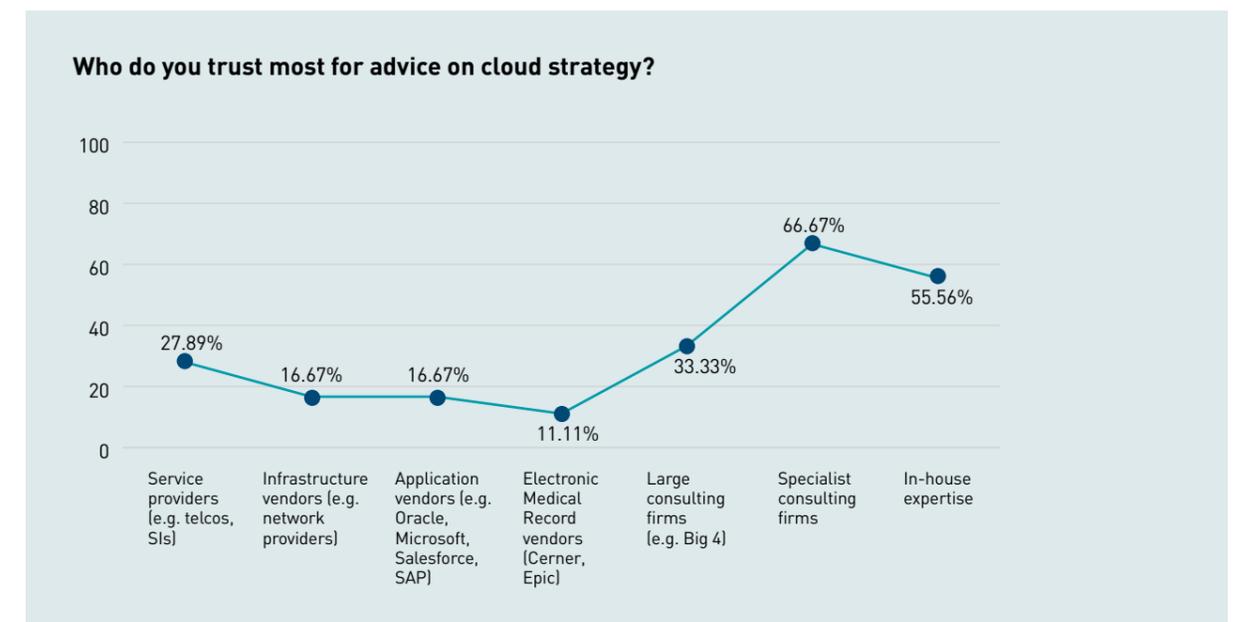


## Where healthcare providers and systems turn for advice

Given the complexity of decision-making in relation to cloud it's not surprising that hospitals don't have a single source of 'authority' in relation to cloud.

When asked whom institutions turned to and trusted for advice on cloud, specialist consulting firms had the greatest currency. Service providers, infrastructure vendors and application vendors commanded similar levels of trust to large consulting firms. The overwhelming source of truth and advice for cloud-related decisions was specialist consulting firms which are a trusted source of advice for two-thirds of providers surveyed.

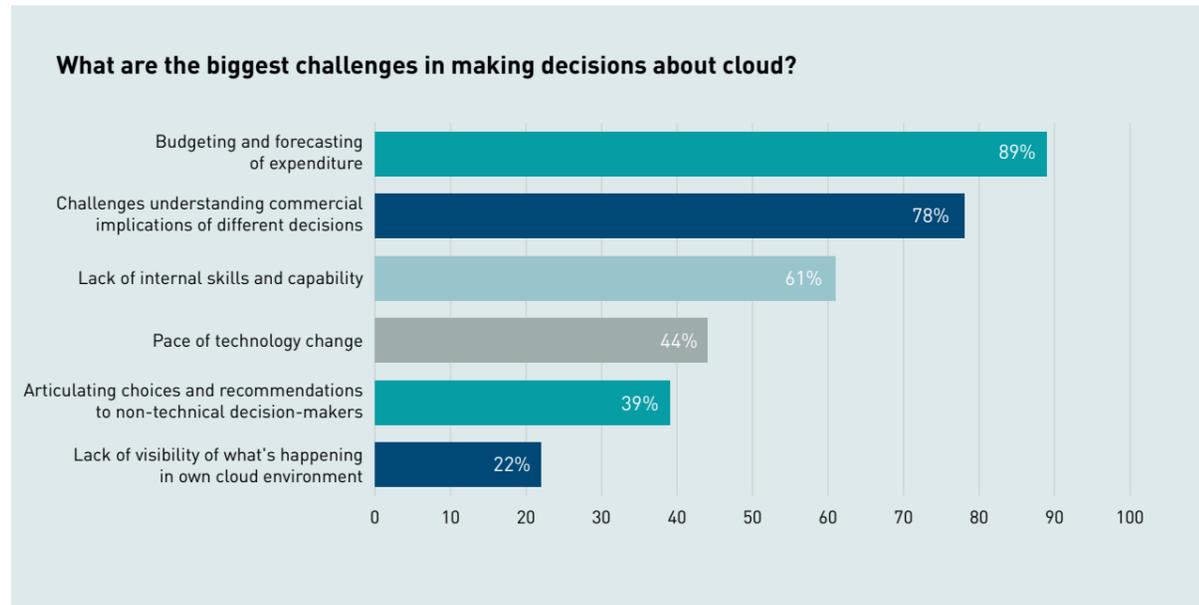
Figure 10: Trusted advisors on cloud strategy



When asked what made decision-making so challenging in relation to cloud there were a number of recurring themes. Interestingly these themes are consistent across healthcare and education.

The major issue for hospitals is budgeting and forecasting for expenditure in relation to cloud, followed closely by difficulties understanding the commercial implications of cloud before making major decisions. Other challenges include internal capability, keeping pace with technology change and improving visibility of what's going on in their own cloud environment.

Figure 11: Challenges related to cloud decisions



## Roadmap for cloud

The logical question on many institutions' minds in relation to cloud is: where to next? Research undertaken separately by Cisco indicates that very few organisations (11%) have fully optimised their cloud environment, leaving significant room for improvement and need for investment. Conversely more than a third (37%) across all industry sectors described their adoption of cloud as 'ad hoc'.

Figure 12: Optimisation of cloud services



Part of the purpose of the study was to understand what's currently driving demand for cloud in healthcare, and what they projected those demands to be in the future. There were a number of interesting observations:

- Patient administration systems were the top driver of cloud demand – but ranked only fifth in terms of future demand.
- Electronic medical records are heading in the opposite direction. Currently they are ranked fourth in terms of generating demand for cloud but are forecast to become the most important driver – and by some margin.
- PACS / RIS requirements are more consistent – appearing as number two on both lists.

Figure 13: What's currently driving demand for cloud

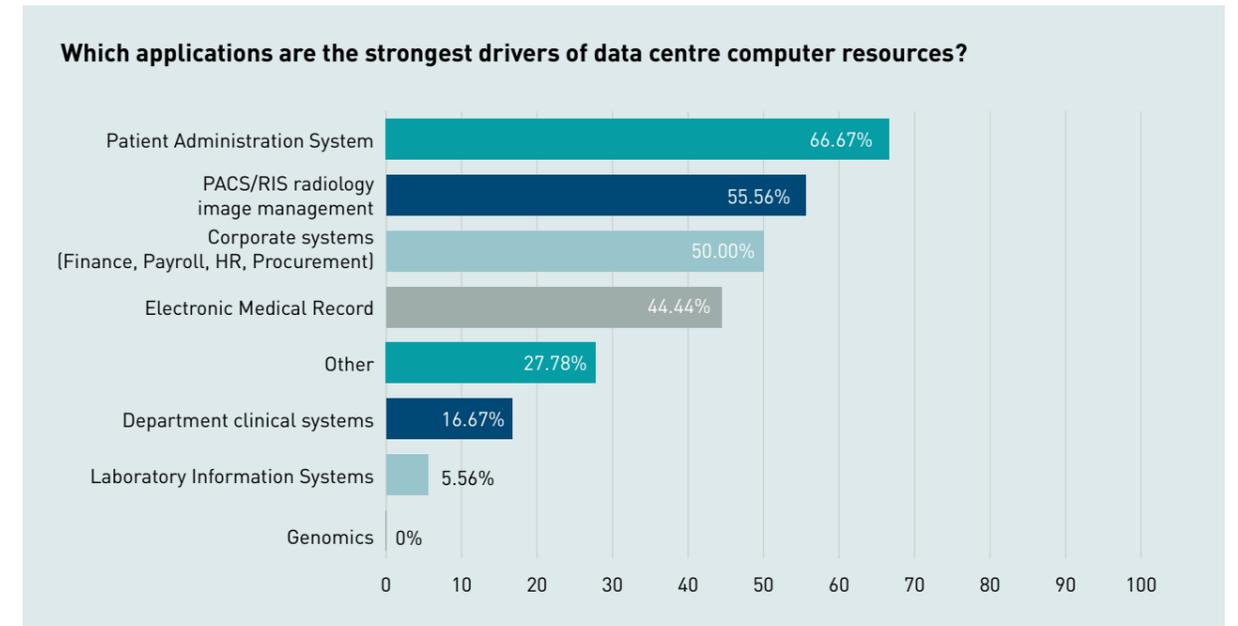
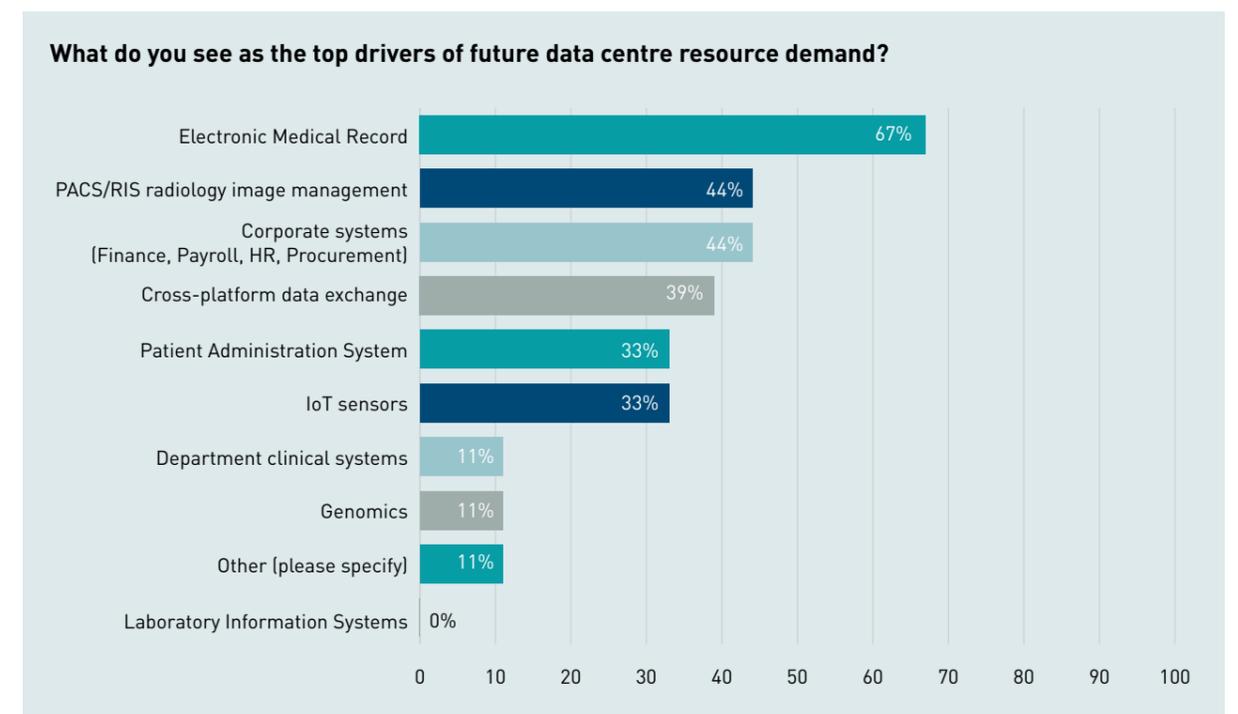
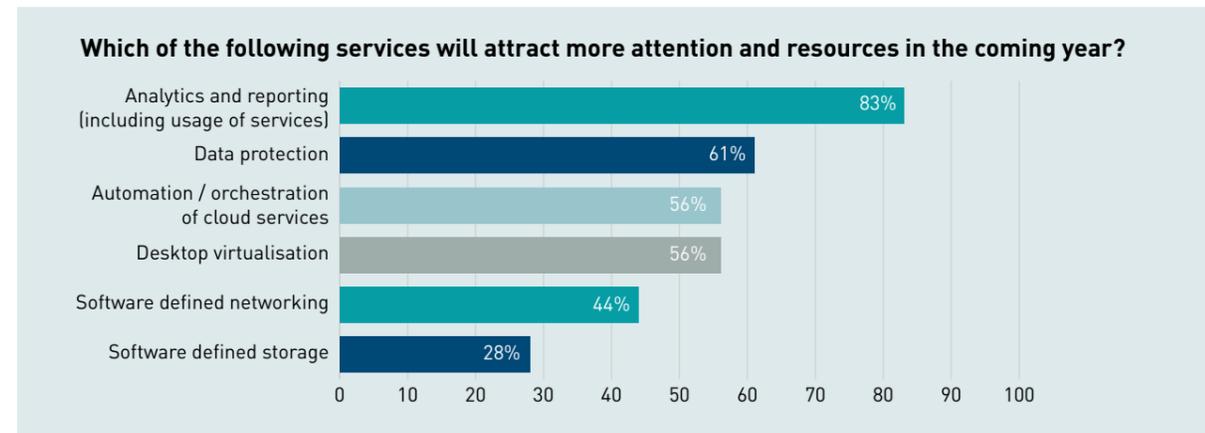


Figure 14: What's likely to drive demand for cloud in the future



The nature of future investments was also explored as part of the study. Institutions were asked to rank a broad range of services in the cloud suite in terms of the level of attention and resourcing they were likely to receive in the coming year. Analytics and reporting is the area of greatest focus (nominated by 83% of respondents) followed by data protection services (61%), and automation and orchestration of cloud attracted most interest (56%).

Figure 15: Where institutional resources and effort are likely to be directed



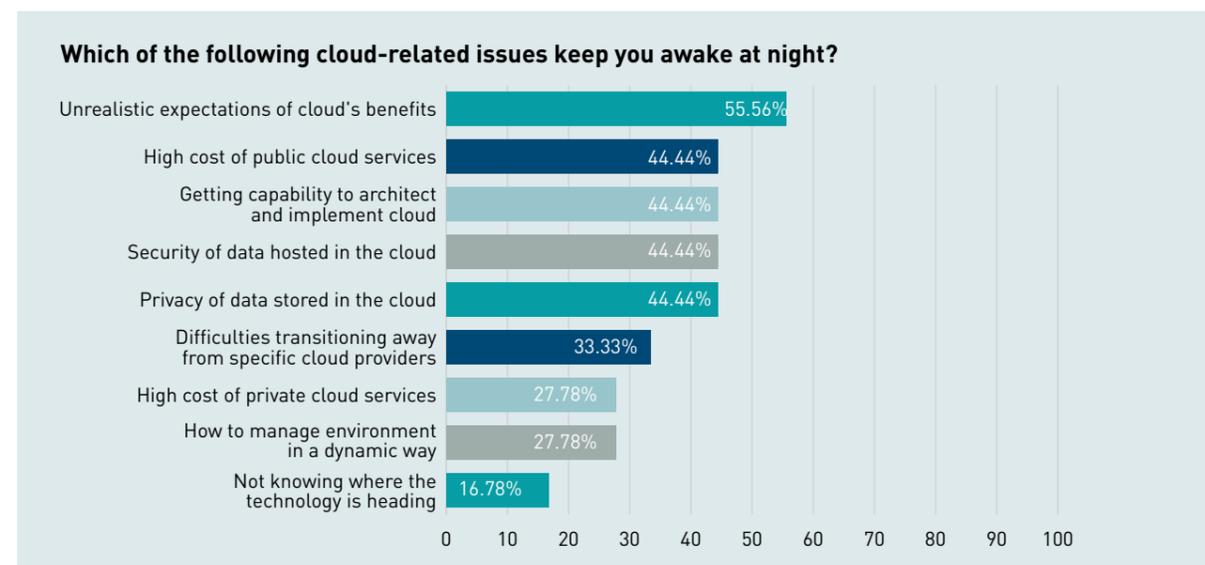
## What's keeping executives awake at night

Institutions were asked to nominate the issues that keep them awake at night. The findings reveal an array of issues spanning the spectrum of finance, human resources, technology and business process.

A number of issues stand out for both the extent to which they are shared and for what they reveal about life in a contemporary education or training institution. They include:

- Unrealistic expectations about cloud's benefits from stakeholders (primary cost reductions)
- The high cost of public cloud
- Difficulties sourcing the capability to architect and implement cloud
- Securing data hosted in the cloud.

Figure 16: Major issues for healthcare providers and systems



# Conclusions

## 1. Healthcare has been a cautious adopter of cloud but it's changing fast

Healthcare systems and institutions have been much slower to adopt cloud than other public sector organisations, notably universities. There are a number of potential explanations for this including the priority given to major PACS and EMR implementations, which seed the need for data centre capabilities but often absorb a health system's capacity for broader new technology introductions. Results suggest that this is changing rapidly as healthcare institutions seek to take cost and complexity out of their operations. One of the major factors driving interest and investment in cloud is the swiftly escalating cyber security threat.

## 2. Strategic planning for cloud remains a major challenge

Commitment to cloud strategic planning is mixed across the sector. A number of institutions are realising that their initial plans for cloud design and deployment aren't necessarily serving them well with a number of institutions declaring their approach to cloud needs a total re-think.

## 3. Commercial rather than technical decisions about cloud are causing most anxiety

The biggest challenges in healthcare relate to budgeting, forecasting and understanding the commercial implications of cloud decisions rather than technical issues. This is in part due to difficulties sourcing the right capability internally to support cloud decision-making.

## 4. Public cloud is not a major focus for healthcare providers

Despite all the discussion about the relative merits of public cloud this type of environment remains a tiny percentage of overall healthcare cloud infrastructure. Private cloud or multi-cloud environments dominate and respondents indicate that this is driven by private cloud's ability to support legacy applications and drive cost efficiencies.

## 5. Future investment in cloud will focus on taking complexity out of their operations

There is significant demand for cloud forecast. Two of the major areas attracting additional investment are could orchestration and automation. This is partly a reflection of the appetite for automation in general but also a comment on the difficulties that organisations have in sourcing requisite skills internally to design, implement and monitor cloud projects.

Vector Consulting is a specialist strategy and technology consulting firm based in Melbourne. Founded by Brad Davies, Vector has a long-standing relationship with Cisco.

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