

# Integrating Care in the Cloud

*Opportunities and challenges in harnessing cloud services in the integration of health and social care*





# 1. Creating new models of care

The landscape is changing in health and social care, with a clear consensus on the vital need for a stronger integration of the two, and that technology is going to be the enabler.

Recent creation of integrated care systems (ICSs) in England has provided structures for the co-ordination of efforts by the NHS and local government; Scotland has integration authorities responsible for working with local communities and funding the relevant services; Wales' national plan includes the development of joint working models; and Northern Ireland has long had health and social care boards. There are clear and solid policy foundations that will underpin future investment in each country. Indeed, these have been major steps towards integration but there is still much to be done to enable organisations to work together more effectively.

Cloud technologies will provide a significant enabler for this change, making it possible for organisations to collaborate, to share data and applications and develop new models of care based on integrated rather than siloed working. They have developed to the point where most digital leaders regard them as the first option to be considered and have become a major element of most public sector digital estates.

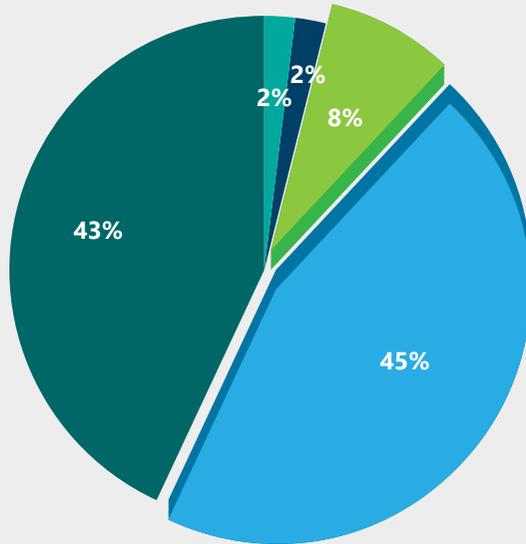
But they come with complexities – often determined by legacy technology and processes, commercial models, procurement responsibilities and the demands of data security – and there are plenty of issues to consider in increasing their role. Organisations have to question themselves about how well their existing operations and digital estates can align with specific cloud services. They need to make sure that workloads and applications will be shifted to the right places at the right time. And there has to be a major effort to ensure that new investments in cloud will align with the plans for closer integration of care services.

There is a great opportunity but also a series of big challenges. UKAuthority and SCC Healthcare have investigated the issue through a series of round table discussions with public sector digital leaders (taking part on a non-attributable basis), a survey of those active in the sector and a review of the major developments. It has highlighted what needs to be addressed and approaches for dealing with the complexities.

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How important do you think cloud technologies will be in supporting development of Integrated Care Systems and new models of care?



1 - Not important 2 3 4 5 - Crucial

## 2. Eyes on the hyperscalers

A survey of 113 professionals in health and social care, conducted for this paper, confirmed that cloud technologies are regarded as highly important for the future of the sector. Asked how important they will be in supporting the development of ICSs and new models of care, the average on a scale of one (not important) to five (crucial) was 4.25, with 88% rating it four or five.

Some of the comments shed more light on the perspective:

*"Cloud definitely enhances our ability to support data sharing with health partners, enabling our on-premise and cloud (public and private) applications."*

*"Cloud is an essential enabler. By engineering out all legacy platforms and moving to a modern cloud infrastructure, organisations remove technical barriers to sharing. Furthermore, with cloud sharing technologies such as Snowflake, organisations can more easily federate their data to trusted partners."*

A key function is in making critical data easily accessible to all the organisations involved in integrated care. There are possibilities that a cloud service can host a central system for an ICS that pulls together data from multiple sources and makes appropriate information easily available for decisions in treating patients and providing care services. It also provides the data for delivering insights that enable early interventions, so that care organisations can get ahead of the curve in anticipating problems for individuals and providing relevant support before they lead to emergencies and hospital admissions.

*"Health and social care data has generally been locked into silos, never to be shared for fear of data breaches. Cloud, and the potential it brings, challenges this culture big time, as people's own experiences and expectations rise as a result of the personal use of cloud tech."*

There are other possibilities. One is in the adoption of a federated model, in which the data remains on those systems but from which key pieces of information, relevant to a specific professional's role, could be viewed at the point of care. This could be



important in meeting information governance (IG) requirements and contribute to building trust between organisations.

*“The NHS has committed to becoming a net zero health service. Cloud supports reduced energy usage and reduces the NHS carbon footprint.”*

functions of ICSs in understanding all the dynamics at work within their borders and using the evidence to underpin their strategies.

Both of the previous two would require careful design, but cloud service providers are offering platforms and tools with increasing flexibility and security, and the scope to add new elements such as machine learning and AI to the mix. It will take time for the solutions to emerge but the technology is evolving quickly.

There can also be significant environmental benefits from cloud, with organisations reducing their own energy usage and cloud providers using it more efficiently to reduce overall consumption. As one survey respondent noted: *The NHS has committed to becoming a net zero health service. Cloud supports reduced energy usage and reduces the NHS carbon footprint.*

Another option would be an ICS level data lake of anonymised data, which would be available to researchers for population health analytics and insights. This would support one of the key

The potential benefits in cloud systems can apply across the market, but there is a view they are more extensive, in terms of scale and scope for how they can be used, when dealing with hyperscalers – the major cloud service providers that offer not just specific applications but platforms and infrastructure for developing services.

The core benefits are now widely known. Digital leaders talk about how moving from on-premise data centres to cloud removes the need to manage the physical infrastructure – such as servers, air conditioning and power supplies – and software systems. It also allows more time to focus on service applications and strategic issues.

*“For me the biggest pragmatic benefit of cloud is in just managing the contract but not worrying about lots of disparate tech on different sites.”*

*“For me the biggest pragmatic benefit of cloud is in just managing the contract but not worrying about lots of disparate tech on different sites,”* was one comment in the discussions. Others spoke about offboarding from data centres and freeing themselves from the *“mess of legacy”*, and that this can encourage a change in mindset focused on the future.

There is a widespread recognition of the capacity to share data in the cloud, applying access privileges determined by the roles of organisations and individuals. This fulfils a core demand of integrated care in allowing organisations to access data on patients and vulnerable people that is appropriate to their functions only.

Participants identified the scope to take this further through the development of trusted research environments, in which sensitive data can be analysed within a secure environment to which only accredited researchers have access. This has been identified as a priority in the Department of Health and Social Care’s (DHSC) [review on health data for research](#).<sup>1</sup>

It reflects the possibilities of different organisations sharing a single solution in the cloud to support service delivery or common administrative processes, which can provide significant cost savings and support joint working. This would be a significant factor at ICS level, with the potential to make operations more efficient and foster a sense of shared purpose between member organisations.





This is one of the areas in which the hyperscale providers have built a strong reputation, as they have the necessary internal skills, with the expertise to make the right decisions when threats emerge, and can make these available to all of their customers at scale. With the public sector struggling to match big private sector organisations for the salaries paid to cyber specialists, this is often a more affordable yet highly effective approach to security. Industry figures say it is easier to create a secure environment, with sufficient scale and depth, within the hyperscale cloud than in-house.

The hyperscalers provide other benefits, with the extent of their own capabilities providing the scope to set out roadmaps for the development of services, and the capacity to adapt and scale them up as necessary. This is partly from the size of their data storage and processing power within their data centres, and from the range of tools they can offer for purposes such as analytics and app development. They can provide platforms and infrastructure to support long term plans for modernisation with the flexibility to make changes and introduce elements as required.

There have also been indications of the major players looking at specific sectors, such as healthcare, with a view to creating dedicated clouds as a basis for specialised services. This could provide extra value for public sector users, enabling them to run applications that are not feasible on their existing infrastructures.

Security is another significant factor. Anxieties around cyber attacks have increased since WannaCry hit several NHS organisations hard in 2017, and the public sector has become a prime target for ransomware and phishing. Organisations cannot pass all the responsibilities for good cyber security practice to cloud providers, but the major ones have established reputations for high levels of security, and maintain strong defences around platforms and applications that are often more effective than clients can achieve in-house.

It is notable that the UK Government has justified the running down of the Public Services Network on the grounds that internet service providers can now provide the levels of security required to protect public sector data. The concerns of a decade ago around the security of cloud systems have receded, and it is an area in which the burden on in-house teams can be reduced.

These factors are feeding the perception that cloud can provide great scope for innovation to support new models of healthcare. On one hand these can support care out in patients' homes, easing the pressure on GPs and hospitals. On another they can align with the setting up of ICSs, offering new approaches to clinical care and co-ordination with social care. This comes with the promise of operational efficiencies, cost savings and high security standards that now prevail in the public cloud. But it also has to be done in a way that works effectively with the dynamics of the health and care sector.

### 3. The ICS landscape

ICSs have been [defined by NHS England](#)<sup>2</sup> as partnerships of organisations that come together to plan and deliver joined up health and care services. Each includes: an integrated care board (ICB), a statutory NHS organisation responsible for developing a plan to meet the health needs of the local population, manage the NHS budget and arrange for the provision of health services; and an integrated care partnership (ICP), a committee bringing together the ICB with upper tier local authorities within the area.

Local authorities retain the responsibility for social care, while place based partnerships of councils, the NHS and third sector bodies will lead the design and delivery of integrated services; and provider collaboratives will bring providers together to achieve the benefits of working at scale.

It is important to note that the ICBs do not have control over every aspect of procurement or planning for the delivery of digital systems, the budgets for which

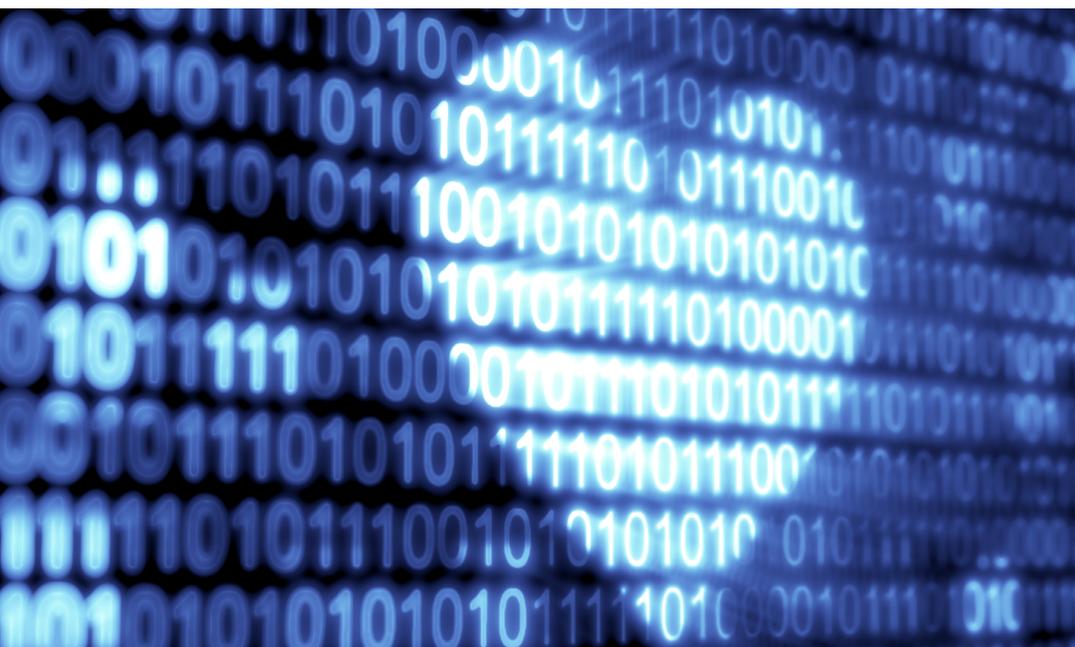
remain largely in the hands of individual authorities, most notably for social care. In theory the place based partnerships should have a strong influence on the details of integrated services, and this should extend to the deployment of digital systems. But it will take time to see how much influence they exert over the spending decisions and operational choices of the organisations within an ICS.

There will be a need to develop the spending priorities and work on converging them throughout an ICS. One suggestion has been the creation of a roadmap that all the primary, secondary and social care organisations in the ICS would be ready to buy into and shape their own procurements accordingly. This is going to be a challenge given the number of organisations involved and the differing levels of digital maturity, but it could begin with an early focus on bringing together a handful of influential bodies into a coalition. If they show they are ready to adapt their own procurement strategies to the roadmap, and begin to use the systems early, it would provide the momentum to attract others and scale up the adoption.

Another approach being taken is for one organisation to take responsibility for relevant procurements, ensuring that they align with the strategic goals of an ICS. However, again this could be subject to inter-organisational politics and relies on solid foundations of mutual trust.

In England, NHS and local government bodies have already made substantial commitments to cloud technologies, but so far these have largely been for internal operations and the progress in using them for integrated care has been limited. There are a growing number of cloud based single care records for regions including [Dorset](#)<sup>3</sup>, [Yorkshire and Humber](#)<sup>4</sup>, [Leeds](#)<sup>5</sup> and [Greater Manchester](#)<sup>6</sup>, bringing together information on individuals for NHS and social care staff to understand their needs from a common base. They are primarily information sources with no functions for more active sharing, most have an emphasis on healthcare data and there are variations of how much social care information is contained. Also, some parts of the country are yet to develop such assets.

The creation of ICSs provides scope for a more ambitious and accelerated approach, and it is notable that DHSC has indicated in its [white paper on integration](#)<sup>7</sup> that they should achieve minimum levels of digital maturity and provide digital single care records for patients by 2024. This comes with a perception in some quarters that their



role in bringing groups of organisations together should promote collaboration and innovation, with cloud platforms providing a technology foundation.

But a report by the [National Audit Office](#)<sup>8</sup> published in October 2022 found that there has been mixed progress among ICSs with their digital and data strategies, with inherent tensions between care strategies based on local needs and national NHS targets. It said they have to manage the tensions and that DHSC should work with other departments on issues beyond clinical healthcare to provide national leadership.

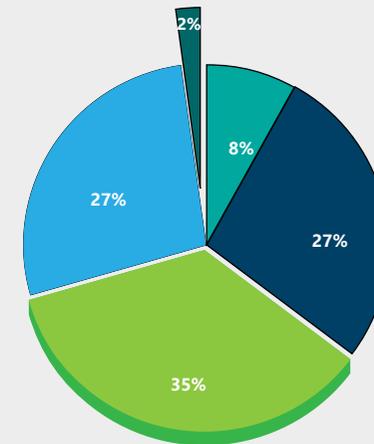
There is also a sense in the industry that the NHS is not close to realising the full potential of cloud, and this provides a more difficult starting point for the ICSs. While digital leaders are highly aware of what it can help to achieve, they do not have sufficient leverage in the boardrooms of many organisations, and there has not been sufficient education throughout the health service on the benefits – and complexities – of cloud. This stands in the way of encouraging stakeholders to come forward with their own questions on ideas on what could be achieved, which in turn makes it harder to build the momentum for further investment.

There are also reportedly wide variations between NHS trusts in the details of their digital infrastructure and applications, which makes it hard to bring together the flows of data to support patients across the system. Much of the investment in the service has focused on electronic patient records (EPRs), but with many of these being based on-premise there are question marks over whether these can provide a basis for a closer integration of services.

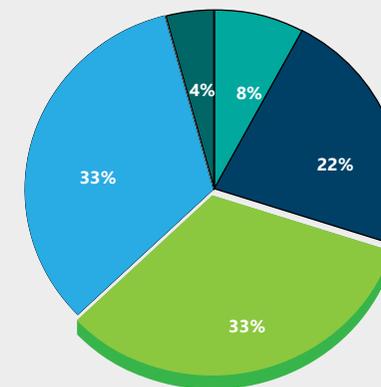
This was reflected in parts of the survey when questioned on the plethora of existing systems across the NHS estate. When asked how big a barrier their legacy technology estate was to delivering the full benefits of integration for their organisations, 35% of respondents said it was 'significant' and 27% 'highly significant'. And when asked how big a barrier the legacy tech was to enabling the use of data in the integration of health and social care, 33% said it was significant, 33% highly significant and 4% insurmountable.

It raises the need for an examination and re-engineering of processes, with a different way of thinking to that which has so far influenced the digitisation of the NHS. This is where ICSs could take the opportunity to influence the change as their

### How big a barrier is your legacy technology estate to delivering the full benefits of integration for your organisation?



### How big a barrier is your legacy technology to enabling access to and use of DATA in the effective integration of health and social care?



priorities revolve around integration, and they could ask different and more pertinent questions. But this depends on them breaking away from the traditional priorities of individual healthcare trusts, which may not happen if their boards are dominated by NHS representatives

There is another question over whether ICSs will have sufficient leverage with suppliers to influence the development of solutions. It has been pointed out that they are not large organisations with monolithic budgets in themselves, and it is unclear whether they will be given larger shares of the funding or the power to direct investment over the long term. They might have the mindset for a new approach but it is unclear whether they will have the power to make it count.



## 4. Questions around cloud

Cloud itself comes with a number of questions and concerns for health and care organisations, none of them insurmountable, but all of which demand a careful approach to how it is used.

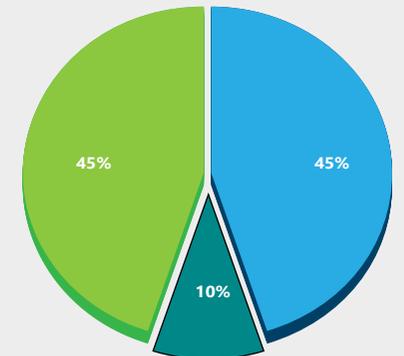
One is that many NHS bodies have big investments in legacy systems such as electronic patient records and digital imaging that are based on-premise. Some observers have said there are not sufficient cloud options – especially in public cloud – for these in the market at the moment, and that the main challenge is in integrating them with cloud systems.

This will be a demanding task and reliant on co-operation from the suppliers, which is likely to come with significant costs and may not be taken for granted. If there is a move to options in the cloud the migration itself would be a major task that would take up a lot of time and energy. This would require a clear understanding of what advantages the cloud systems could provide and the balance of benefits in how they would best be used.

This is reflected in the responses to a survey question on whether respondents had any mission critical applications in use that are unsuitable for migration to public cloud

**Do you have any mission critical applications in use today that are unsuitable for migration to public cloud services?**

Don't know Yes No



services. Forty five percent confirmed that was the case, while 45% did not know and only 10% were sure that it did not apply. The examples cited included applications for social care, mental health, financials, EPR, some corporate data management systems and call monitoring platforms for analogue devices. One respondent suggested this could apply to anything involving identifiable data.

*“We investigated this and found that most vertical applications would not be supported by the vendor if put on a cloud service.”*

One comment in the debates was that organisations would have to learn from the experience of making big investments in legacy systems that were highly specified and configured to the point where others would not want to use them and as a result are too difficult to integrate. The need for integrating care creates an extra demand that has to be taken into account in the business case. “It’s about getting to where cloud makes sense on an economic basis,” was the conclusion.

There is also the fact that many existing systems have been built to run on internal infrastructure that has served them well but cannot provide sufficient support for cloud solutions. Some have very large data requirements and run on latency levels

that are much lower than is currently available on the external networks needed for cloud.

The Health and Social Care Network (HSCN) provides a national infrastructure with high bandwidth connectivity for most of the country, but there have been complaints that while it is effective in high population areas it is much less so in rural locations. This is creating a situation where some rural care sites are still reliant on connections well short of 1Gbps. The situation is reportedly improving year-by-year but Gb coverage is still not universally pervasive.

This feeds a perception that it is not yet possible to run some applications – estimated at up to a half for some trusts – in the cloud from some locations. But there is also a more positive view that the evolution of 5G networks and improvements in Wi-Fi will gradually bring down the infrastructure barriers, providing the scope to move more data and applications to the cloud.

*“Networking comes into play with your cloud access. There are organisations that have big monolithic hospital buildings and we spend a fortune on making sure the LAN networking infrastructure is built with enough capacity to move all those PACS images about in a very quick and efficient way.”*

*“When you go to mobile working and begin to share images across geographical boundaries, we start to see the constraints of our national networking infrastructure, which in many areas becomes a barrier to cloud in some ways. However, as the national infrastructure improves that barrier becomes a facilitator because it means if you can coax something from the internet you can get mobile access through 4G, 5G, Wi-Fi to those applications. So those barriers start to disappear and it becomes a facilitator by having more of your data in the cloud.”*

The pragmatic approach is a mixed estate - hybrid and multi-cloud - developing a digital estate that mixes on-premise with public and private cloud services, and provides the capability to move data, applications and workloads between clouds as required.

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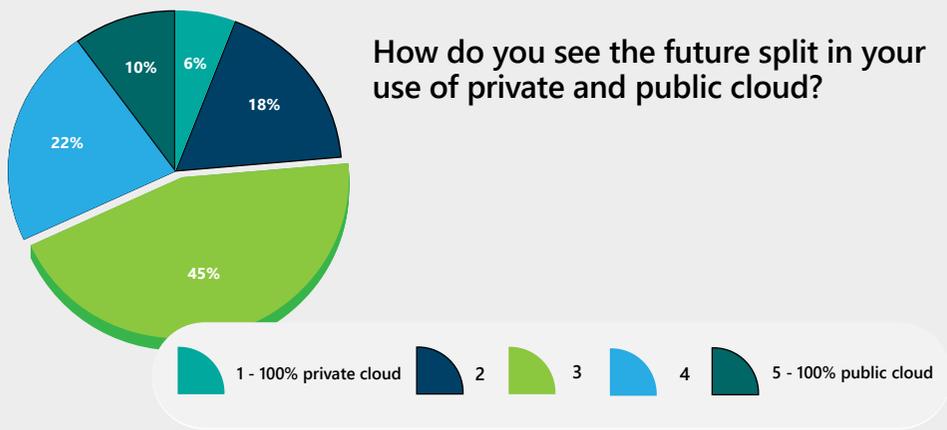
Answers to a survey question suggest that this mix is likely to lean towards public cloud. When asked to rate how they saw the future split, with one for 100% private cloud and five for 100% public, the average was 3.12, with 17% showing four or five for public and 12% showing one or two for private.

The details of the split are of course going to vary between ICSs and the organisations that work within them, influenced by their own assessments of the commercial factors, risk, security and how it fits within their broader digital estates. These will be subject to change over time and it is unlikely that a definitive formula will emerge. But there is an increasingly strong consensus that hybrid models will be the norm and that, in line with the Government's 'cloud first' policy, public cloud will be prominent in the mix.

*"It's not about identifying cloud as one thing but using the concept of cloud to make data more accessible, secure, reliable. It is absolutely integral to the future of health and care and our ability to share data effectively across boundaries."*

Organisations will need to ensure that contractual arrangements give them the scope to do this. There are fears around cloud lock-in, on a par with supplier lock-in to on-premise solutions, and they have to be sure they have the flexibility to quickly migrate from one cloud to another, managing capacity where they are holding data and applications and taking advantage of new capabilities from an alternative provider.

There is also a need to ensure there is sufficient interoperability between clouds to make this possible. Participants in the discussions whose organisations deal with



detailed medical imagery said that this cannot be taken for granted, and that some have found it a major task to transfer the data from on-premise to cloud systems and are reluctant to handle another migration.

Inevitably, cyber security comes into the picture. Given that high levels of security are now a big part of the sell for cloud services, it has a flip side in that organisations are placing a lot of trust in the hands of their suppliers; and there has already been [one major incident](#)<sup>9</sup> in which a digital services provider to the NHS has been the victim of a ransomware attack, leading to the disruption of services. If data becomes inaccessible the organisation is completely dependent on the supplier to recover access, and whatever compensation might be provided through a contractual agreement it still needs the data to treat patients or support vulnerable people.

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It is one of the areas in which a multi-cloud approach can provide benefits, with one provider acting as a back-up for the one on which systems are run day-to-day.

*"One thing I consider a lot is not to put all the eggs in same basket, so we will not use just one cloud provider. Use at least two and don't do back-up on same cloud, use the other as back-up for each other. If one comes down my data is secure. And you can specify regions or locations."*

But it requires some effort to ensure the suppliers are investing time and resources in their cyber risk management. Participants expressed the view that it is not enough to look for the regular accreditations – the 'tick the box' approach as one described it – but there is a need to think about potential threats, ask questions and request evidence on how the cloud service is managing these.

Another possibility is to retain the ability to lock down applications in the event of a cyber incident and arrange for another route in which staff can get access to critical systems.

This all comes with the usual demands of ensuring that the organisation has its own security capability, with a chief information security officer or the equivalent in place, people with the appropriate skills, and a high awareness and good cyber security practice among staff. There should never be a 100% reliance on the cloud provider for cyber defences.

One point made in the discussions was that: *“Security is a layer cake, with so many layers, and you have to get it all right and have good business continuity arrangements in place, and assess on what would happen if you lose access for a day/ week/month. Cloud is a facilitator to better security, but you have to make sure the contracts are right, and you are reliant on suppliers developing cyber capabilities. You have to work with trusted partners.”*

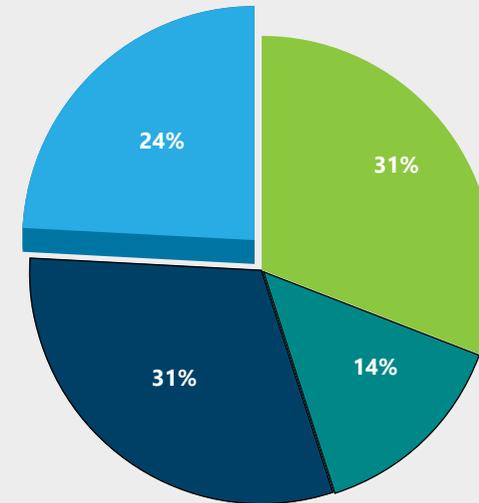
This is all complicated by the increasing deployment of new technologies and devices to support remote monitoring of patients, the evolution and implementation of virtual wards and managing the risk of vulnerable people in their homes. These raise the prospect of new cyber risks, many of which could not be understood in advance, with the possibility of providing malicious actors with a backdoor way into core systems. It requires a careful assessment of the possible risks before deployment.

There are signs of this being taken seriously by the sector. A survey question on whether organisations include an assessment of risk from the increasing numbers of medical and internet of things (IoT) devices showed that 31% had a process in place and another 14% planned to implement one within the next 12 months. An additional 31% were at least investigating how to carry out assessments, and only 24% said they had no plans, although this was primarily because it was not considered relevant to their specific activities.

Data sovereignty is also an issue. The sensitivity of personal data used in integrated care heightens concerns that it remains in UK data centres and, while the hyperscalers are generally equipped to meet the requirement, it will inevitably influence the choices of which cloud providers will be used in the future.

This was borne out by the survey question asking how important an issue it is on a scale of one to five, which drew an average response of 4.45 with 86% rating it four or five.

## Does your cyber security today include assessment of risk from increasing numbers of medical and IoT devices from virtual wards connected to information systems?



## 5. Technical challenges

Nobody pretends that the migration to cloud and integration of systems is an easy process. It is a vast undertaking of constantly moving parts, and there are plenty of technical factors that can create additional complications and challenges.

A big factor is where the crucial data has resided before it begins. As mentioned above, many organisations have for a long time depended on legacy proprietary systems that were not designed for the data to be shared or extracted, and if it is possible the suppliers may well be reluctant to facilitate the change.

It was pointed out that some cloud providers have mechanisms to extract data from legacy systems, but it works more easily with some than others, and there are further challenges when you pull data from multiple systems into a central area. Each case will have to be addressed on its own circumstances but it will often require significant effort to ensure that data can be effectively pulled together into one source and appropriate access arrangements put in place.

Some digital leaders promote the importance of a data archiving strategy in this, saying it lays the ground for ensuring data from different systems is compatible. There is also a case for abstracting data into data lakes, where the provision of interfaces for different functions such as document management or electronic patient records can be provided. Its advocates say this can be an asset in overcoming a lack of co-operation from legacy suppliers and provides the scope for a holistic approach in using the data.

*"That's how our shared care record works; the supplier looks at our data lake, uses it as single source, then shares it through in-context use across our different systems. I think that's the right way to go. I don't think any of us would be comfortable trusting each other's on-premise data centre environments for this data; it's very sensitive and at scale. Cloud gives us neutral space we can architect from the outset to be at the right level for what we are trying to achieve."*

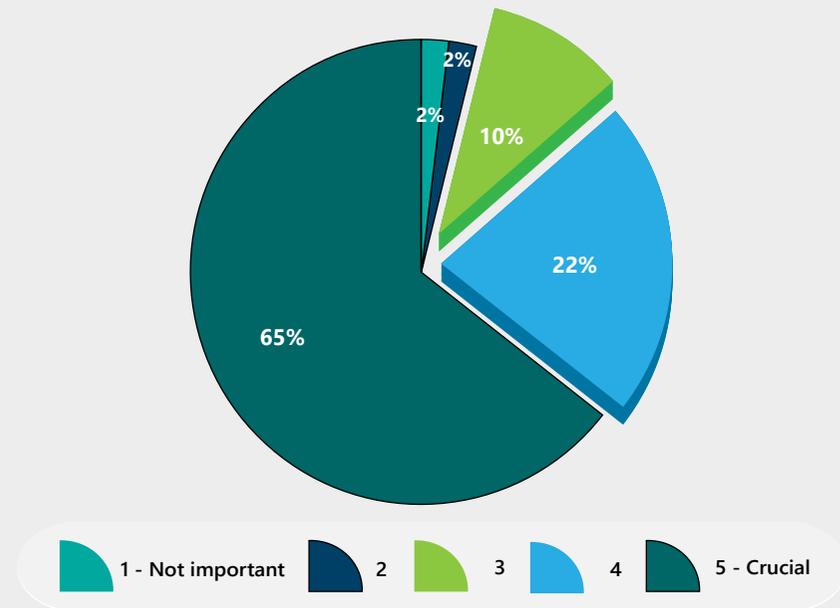
Other developments are adding to the complexity, such as the provision of data

from IoT sensors in assistive technology, the development of virtual wards for healthcare with the capacity for detailed remote monitoring of patients at home, and the increasing use of digital twins, simulations of physical and social environments that enable modelling and scenario planning in the development of services. These impose their own demands and may require data that is not yet held in any of the systems used, so could require that it is collected from other sources and is structured to be compatible with that already in place.

*"We have to find a way to have a truly strategic approach across geographies supported by integrated care systems. We need a joined up strategic roadmap."*

Managing this complexity requires a new level of skills, as does the ability to assess the capabilities of specific cloud services, use those that are most appropriate for functions in care, and be ready to move data, workloads and applications between them as demand changes or new options arise. It has been on the agenda for some

How important is data sovereignty to your cloud choices?



*“Realistically it’s about working with application vendors and others to say ‘How can we work together to help you move to cloud at a sensible pace and us to get something more open from an API perspective and therefore more integratable with other applications.”*

time and the survey indicated that 18% of respondents believed their organisations have all the skills required for the migration to and management of cloud. But 51% said that, while they have good internal capabilities, they sometimes need to bring in specialists from outside; and 31% acknowledged they have significant skills gaps that make them dependent on external expertise. One comment was: *“The barriers are due to staff IT competencies and the time to have more training.”*

It suggests there is a need to further build capability in the sector as a whole, but there is always likely to be some need for external support as both the market evolves and new demands arise. The balance will fluctuate over time and it will be important for an organisation to have the resource to buy in the skills when needed.

Underlying these points is the fact that, with multiple organisations involved in integrated care, it is not realistic to expect all of them to change their systems, and some may not have the resources to make their data compatible with others.

Such points feed the consensus view that it would be a mistake to try to go too far too quickly in a cloud strategy, and that it is more realistic to take a gradual approach over a period of years.

One option is to begin with moving systems at the periphery, rather than those used for high volume day-to-day operations, to the cloud, then begin a measured transformation of the back end. It was pointed out that there are services for functions such as transcriptions and translations that can be deployed rapidly to provide new benefits, and these can show value and pave the way for the migration of larger systems.

There is an understanding that the challenges would likely be more manageable if legacy systems were available in the cloud, but also a sense of frustration that some suppliers have been reluctant to make the move.

This raises the question of whether public authorities can force the move, and there are different perspectives on the prospects for this. In the discussions some participants took the line that most organisations do not have the weight in the market to achieve much by themselves, and that it needs a co-ordinated effort from the centre of the NHS or DHSC to give it a chance of success. But at least one said that their organisation had taken the initiative, asking potential suppliers to provide evidence of having credible roadmaps to cloud, and writing an interoperability document with which they would have to comply - and discarding any of those that would not agree to do so.

An organisation may be able to force the issue at the right stage of its procurement cycle if it has enough buying power; and there may be scope for groups of them to



collaborate and increase their influence on the market. But it will also need a dialogue with suppliers and, as one participant suggested, public bodies will have to work out where they can be insistent on a change and where they will have to compromise.

*"Realistically it's about working with application vendors and others to say 'How can we work together to help you move to cloud at a sensible pace and us to get something more open from an API perspective and therefore more integratable with other applications.'"*

The comment above came with a suggestion that this might be achieved through a containersation strategy that involves the packaging of software code into isolated user spaces that run consistently on any infrastructure. This is a widely used element

***"It is fundamentally important, but depends on whole systems planning and digital leadership from within ICSs, not individual trusts and hospitals. It also requires much better planning and delivery from NHS England."***

of cloud native applications, allowing developers to create and deploy them quickly and securely.

Some also hope that new suppliers will emerge, disrupting the market to make cloud the default of any new systems and forcing legacy suppliers to change tack. But this comes with an acknowledgement that the health

and care sector provides a limited number of customers, and it is open to question whether they will cumulatively provide enough of an incentive to encourage a commitment by a new player, at least in the short term.

*"We have to find a way to have a truly strategic approach across geographies supported by integrated care systems. We need a joined up strategic roadmap."*

Information governance (IG) also comes into the picture, with a need to ensure that any solutions comply with the Duty of Confidentiality and the UK General Data Protection Regulation, with clear guidance for the NHS in how they store and process personal data. While cloud suppliers can provide some assurances, the organisations will have to maintain their own efforts, with IG specialists and processes to ensure that systems are used within the legal obligations.

All these issues will test the capabilities of the ICSs and other organisations. Overall, it requires them and their people to think about consuming technology in a different way, and this raises its own challenge in overcoming the cultural barriers to change.

When people are busy with little time to spare it is a lot to ask them to learn to do things differently, and it needs an effort by the digital leaders and their teams to get others to accept the change. This can be helped by a clear plan and the ability to show people the benefits to their own work that they could achieve.

*"You need to take away people barriers before you look at technology. The technology and use of cloud is the easy bit. But we have too many people protective of their own processes and procedures to allow technology to work effectively. There needs to be a complete change in culture and mindset."*

*"It is fundamentally important, but depends on whole systems planning and digital leadership from within ICSs, not individual trusts and hospitals. It also requires much better planning and delivery from NHS England."*



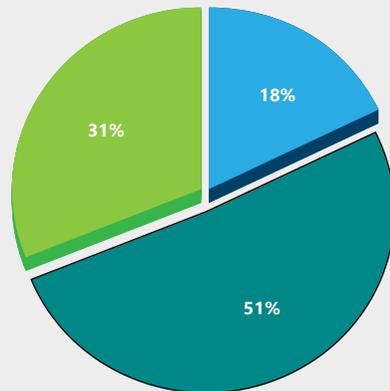
## 6. Costs and budgets

The move to cloud has created a different set of financial demands in running a digital estate, shifting away from the traditional need for extensive capital investment in on-premise infrastructure and fixed term software licensing at set prices to a more fluid model. Despite the potential for long term benefits there are significant costs that have to be managed.

Some of the debate participants regard the cost of cloud services as relatively expensive. Although much has been made of the savings in the model in which payments are based on usage, the unit costs can push these up, especially for the high volume services in health and social care. Concerns around this are increased by an expectation that, as more specialist cloud services emerge for clinical processes, they will come with a high price tag. It also relates to worries about lock-in and how easy it would be to move to a more competitive supplier.

*“There’s a massive disparity between the funds needed to replace significant legacy systems and the ever-reducing funding. Upfront costs are a real challenge.”*

Does your organisation have sufficient skills in-house today to manage migration to and management of cloud services to provide high quality care?



We have all the skills we need in our team today



We have skills across the board but bring in specialist resource when needed



We have significant skills gaps and rely on external resources

There is a need to ensure there are no hidden costs, either in the cloud service or in making expensive changes to internal systems and data flows. A number have been identified, including possible exit costs for moving data out of a cloud, which often comes as a surprise to the customer organisation and can apply for active downloads, applications and workloads. Similarly, retrieval of archived data could come with an unexpected price tag that could impose a drain on budgets.

*“There’s a massive disparity between the funds needed to replace significant legacy systems and the ever-reducing funding. Upfront costs are a real challenge.”*

Discounts on signing for heavy storage or processing capacity can often encourage an organisation into buying much more than needed, leading to a waste that could have been avoided by paying for lower capacity at a higher unit cost.

On the flip side, there could be limits to scaling up that, if there is a need to exceed them, could create significant extra costs when it becomes necessary. There may also be services attached – such as video conferencing – that are free for a set period





after which they are subject to significant charges. This can be difficult to handle if the organisation has got into the habit of using them on a regular basis, whether the costs come in licensing per user or on a pay-as-you-go basis.

These issues require a careful examination of the terms and conditions of any cloud services, an awareness of the possibilities, and there has to be a full understanding of the workloads and processes and whether a cloud service will meet the requirements into the long term. This will provide the basis for a more detailed assessment of the costs to expect as a cloud based service evolves.

An ongoing issue that has been difficult to resolve is whether the money for cloud services comes from capital or operational expenditure. The nature of cloud indicates that IT budgets traditionally channelled through capex do not fit easily within the pay-as-you-go model; but traditionally public sector bodies have found it easier to make the case for capital rather than operational funding. This dilemma has been around for some time but organisations are still grappling with it.

Responses to another survey question confirmed the point – on whether procurement processes within respondents' organisations enable them to easily buy cloud services.

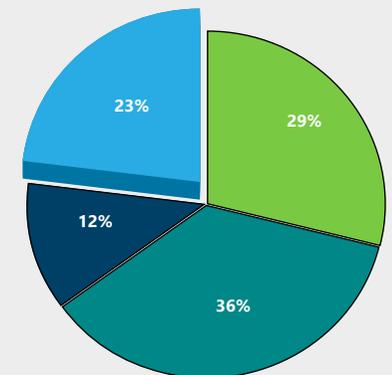
Only 29% said they can easily do so through capex, and 36% through opex. 12% said their processes just do not currently align with cloud offerings, and 23% said there is some scope but also a need for modernisation to accommodate cloud delivery models.

One possibility coming from the supply side is to aggregate various services so that they can be paid for from capex, and doing so in a way that meets regulatory requirements and will satisfy the auditors. It calls for some imaginative thinking in how to structure the commercial relationships but it can produce results.

Further complications arise from the nature of central government funding, especially for NHS bodies, which is often related to specific initiatives and has to be spent within tight timeframes. This makes it difficult to plan investment in cloud within the revenue model used by the service providers. It also appears counter-intuitive to taking a long term strategic view in how the services are procured and used. There have also been complaints that money, especially from funding competitions, comes up late in the year in which it has to be spent, which can lead to hasty decisions on how and where it is spent.

*"We live in a revenue world; don't buy stuff any more, it's licensed and consumed by megabytes or gigabytes. We can bring project managers or analysts in for whatever we do, but last minute is no good."*

**Do procurement processes in your organisation enable you to easily buy subscription based services (eg cloud based)?**



easily go through Capex

easily go through Opex

Processes don't currently align with cloud service offerings

Processes need to modernise to accommodate cloud service delivery models

*"It's not procurement, it's not local, it's Treasury rules. It's about capital and revenue, not about your procurement. Basically, rule of thumb is that you can't spend capital on cloud based services. But there are one or two people who have innovative ways of doing things."*

The discussions revealed a handful of suggestions on how to deal with the capex/opex split and achieve an effective approach to procurement.

One is to make a long term deal for a cloud service under which it can be labelled as capital spending, with an amortisation that allows for the payments to be spread

***"We spend a small fortune on data centre infrastructure, even more on cooling it and the people who keep it running. There are people better placed than us to manage the infrastructure, which will release our staff and let them focus on business value rather than managing Windows servers and back-ups etc."***

over time so they do not all have to come from one year's allocation. This explains the common use of three- or five-year contracts, the latter often with options to extend for two more, for services based on revenue models. But it needs a reasonably accurate projection on how much a service will be used over the period to ensure that it provides an acceptable return on investment (RoI) without wasted capacity.

Another is to use rules defining what can be included on an asset sheet in defining the relevant contracts, which provides more flexibility and, with a clear view of how much can be spent over a timeframe, helps in estimating an RoI.

This comes with a desire to have as much of the capital funding as possible made available early in the year to allow for a more considered approach to how it is spent.

*"In my view, the sooner we can get all of the best of the digital capital passed to the ICSs at the beginning of the (financial) year in a multi-year strategy so they handle it themselves the better. Bidding for frontline digitisation with others I would rather avoid."*

One participant claimed that some of the problems derive from how organisations

interpret HM Treasury rules about expenditure allocations, and that "there is a need for some enlightenment on rules of engagement". Senior financial officials in the NHS could learn from examples in central government in which work programmes that run over a period of years have been set out, with funding allocated in a way that fits within the rules. This can involve the development of a roadmap that sets out what needs to be done, and in order of priority, in primary, secondary and social care, making clear how much is needed for each stage. This could help digital leaders in ICSs create some traction with the financial leadership to help fund programmes effectively, and ultimately influence the way the NHS as a whole operates.

There is also a view that there is more scope to develop the long term plans and tailor the investment approaches in collaboration with the hyperscalers, which have the size and flexibility in their own financial models to find common ground.

The appropriateness of such solutions will vary between organisations, with each subject to its own factors on how well they could work. But there is consensus that for most there is a viable case for a long term savings in the cloud. One official provided the following rationale:



*"We spend a small fortune on data centre infrastructure, even more on cooling it and the people who keep it running. There are people better placed than us to manage the infrastructure, which will release our staff and let them focus on business value rather than managing Windows servers and back-ups etc."*

Another emphasised the scope to reduce the costs on energy, maintaining space in buildings and refreshing equipment through using cloud, adding: *"There are a lot of things to consider, and it's about bringing it all together, finding ways to afford it and continue in transforming the estate."*

There are many inflexion points in these factors, with subtle variations that can make a large difference to what works best for particular organisations. It means that there is no standard process for making the decisions, and while organisations can learn from each other on how to manage the costs and budgeting for cloud, they will need to find balances that are right for their specific conditions.

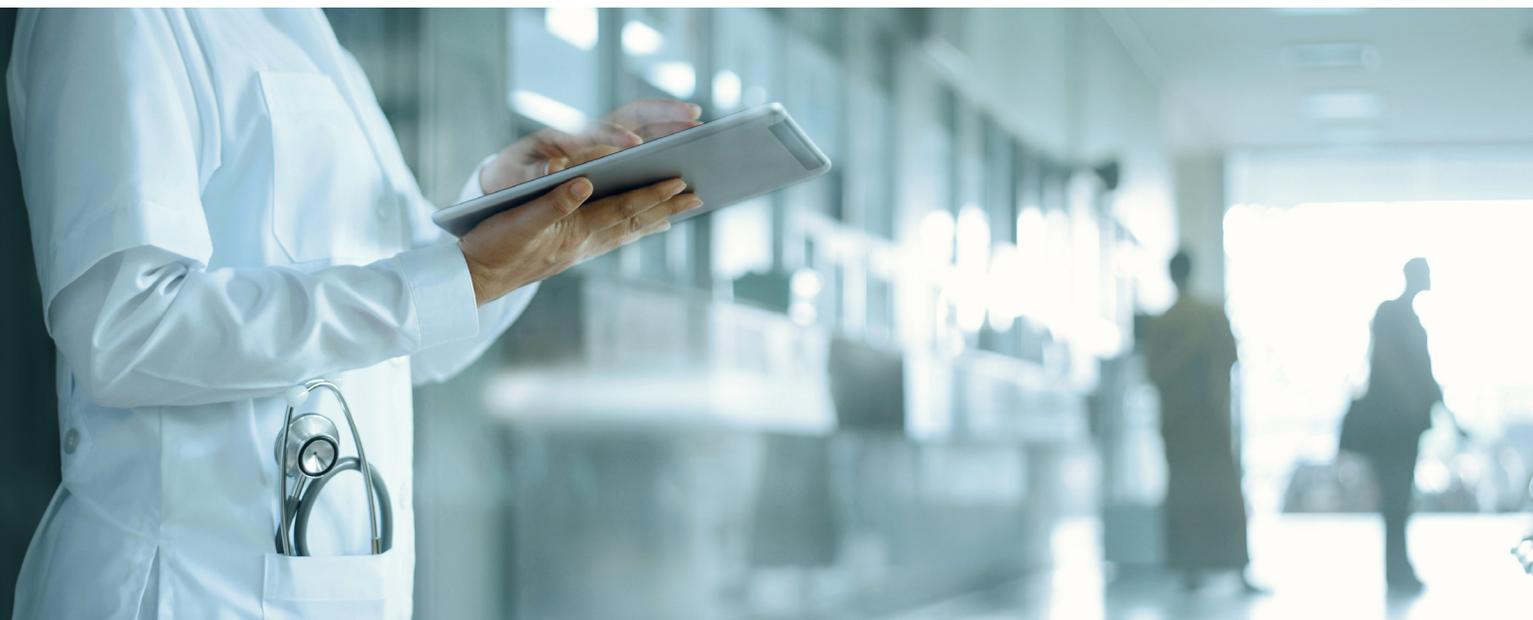
This is where knowledge of the market and the capabilities of different systems is as important as understanding their own financial dynamics and service requirements; and it is where many can benefit from external expertise.

## 7. Transformation not migration

There are complex issues to consider here, and ICSs are still developing their internal structures and approaches to decision making, which means there will inevitably be variations in how they deploy cloud in integrating care. But the discussions made clear that a couple of points should remain prominent in their thinking.

One is that cloud provides for a mindset change among digital leaders, in which they are freed from many of the day-to-day pressures of managing IT and able to devote more attention to strategic issues, working with senior officials and service teams on modernising services.

The other is that in assessing the options and planning for change they should talk not about migration but transformation. Focusing on a 'lift and shift' approach to cloud can produce some benefits, but not on the scale of looking at how the services can provide new possibilities for working between teams, the more inventive use of data and bringing in more stakeholders. This will provide the scope for new approaches to individual care and public health initiatives, and make a big contribution to the closer integration of health and social care.



## 8. The discussions



UKAuthority

As a core part of the research for this briefing note, UKAuthority's publisher, Helen Olsen Bedford, hosted a UKA Live discussion exploring how important technology is to integrating health & care. This was then followed by our flagship virtual conference across three mornings on digital, data and technology infrastructure. Both virtual events can be viewed in full on the UKAuthority website

[www.ukauthority.com](http://www.ukauthority.com)

### UKA Live: Is technology key to integrating health & care?

*How important will DDaT and cloud technologies be in the successful implementation of integrated care systems and new models of care?*



**Malcolm Whitehouse**  
CDIO/SIRO, NHS  
Greater Manchester  
Integrated Care



**Owen Powell**, CIO,  
Central & North  
West London NHS  
Foundation Trust



**Geoff Connell**, CIO/  
Director of Digital,  
Norfolk County  
Council



**Martin Dean**, Chief  
Digital Transformation  
Officer, SCC Healthcare

[Watch now](#)



### The Survey

*Anonymous online survey using Microsoft Forms with 113 responses from digital, data and technology professionals in the sector.*

## Powering Digital Public Services 2023

*Harnessing digital, data and technology to power the delivery of health and public services*



**Damon Crawford**  
Practice Director,  
SCC Hyperscale &  
SCC Cyber



**Daniel Cartter** Head  
of the Innovation Hub  
SCC Healthcare

[Watch now](#)



### Round table participants

**Adrian Byrne**, Director of IM&T, University Hospital Southampton NHSFT

**Clare Cassidy**, Lead Architect, NHS England

**Geoff Connell**, CIO / Director of Digital, Norfolk County Council

**Helen Olsen Bedford**, Publisher, UKAuthority

**James Hennigan**, Managing Director, SCC Hyperscale & SCC Cyber

**Jon Burt**, Head of Enterprise Architect, Manchester City Council

**Kwesi Afful**, Assistant Director - ICS Collaboration Technology, NHS England

**Leonardo Tantari**, CDIO, Leeds City Council & NHS West Yorkshire ICB

**Malcolm Whitehouse**, CDIO, NHS Greater Manchester Integrated Care

**Mark Say**, Managing Editor, UKAuthority

**Martin Dean**, Chief Digital Transformation Officer, SCC Healthcare

**Mike Culshaw**, CTO, Pennine Care NHS Foundation Trust

**Owen Powell**, CIO Central & North West London NHS Foundation Trust

**Rob Harder**, ICT Infrastructure Manager, Plymouth Hospitals NHS Trust

**Sam Hall**, Director Primary, Community & Mental Health Digital, Digital Health and Care Wales

**Stephen Dobson**, Chief Digital Officer, Lancashire Teaching Hospitals NHSFT

SCC has helped its customers deliver successful technology programmes in healthcare for over 25 years. During this time we have built a wide customer base, in-depth knowledge and insight into the challenges facing the sector.

Effectively delivering any organisation's strategic vision requires a mix of technologies, platforms and workloads at both the data and infrastructure layers working in harmony. The end goal is to deliver meaningful real-time intelligence to support critical decision making on both the clinical front line and at board level.

SCC can provide both the framework for a clear understanding and strategic direction as well as implement the necessary core technologies. We can take you through the full process of building a strategy and a Cloud Centre of Excellence or simply one of migration and fulfilment. Cloud inevitably plays a key role today but is not a strategy on its own, it is simply a mechanism to deliver, so let us help you navigate the direct path to successfully innovating, once, in the cloud.

## UKAuthority

This briefing note has been researched, written and published by [Mark Say](#) managing editor & [Helen Olsen Bedford](#) publisher, UKAuthority.

[UKAuthority](#) champions the use of fire, health and housing, to improve services for the citizens they serve.

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