Progress Towards Cloud: Relief, Considerations and New Opportunities

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Introduction

Cloud has shone as one of the most talked about market trends in radiology IT in the last several years. The role of cloud in cybersecurity, SaaS business models and an evaluation of vendor technology stacks has been centre stage at major industry conferences. With so much focus, this new paper revisits and builds on the insight and analysis published last year in the "Journey to the Cloud: Provider Considerations, Key Learnings and What's Next" paper.

For this paper, Signify Research conducted 4 primary interviews with US-based healthcare institutions, with participation from 8 prominent and experienced healthcare professionals in clinical, IT and C-suite positions. It's important to note, that of those 4 participating institutions, two participated in last year's whitepaper, accompanied by two new institutions. An overview of the sample can be found below in Figure 1. All of the sampled providers have transitioned from on-premise implementations to public cloud deployment of their complete radiology IT solution (PACS) in the last few years.

Figure 1 Detail of Sample

Provider	Provider Type	Location (US)	Cloud Go-Live
1	Rad Group/ Telerad/ Outpatient	Midwest	Nov 2022
2	Cancer Centre of Excellence	East Coast	April 2024
3	Academic	West Coast	Dec 2021
4	Integrated Care Network	North East	March 2024

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Throughout this paper, we'll seek to delve further into stakeholder experiences with the cloud, whilst continuing to share considerations shared by the participants to support providers assessing their own cloud journey.

Near-Term Advantages of Public Cloud

When assessing the benefits of transitioning to the cloud, robust quantitative measures remain a mid-term ambition for the sample panel, therefore, we delved into qualitative feedback collected throughout their institutions since transitioning to a cloud PACS. Throughout the discussions, there was a harmonised consensus of the broad relief experienced across different stakeholders since moving to the cloud. Below we have consolidated the main themes shared by the participants:

Figure 2 Use Cases of Near-Term Advantages by Providers

Overall Theme	Key Notes from Providers
Cybersecurity	Day to day management and ability to react quickly
M&A and Outsourcing	Ease of growth / onboarding institutions
Optimising IT Team and Investment	Re-deployment of IT resources
Radiologist Satisfaction	Flexibility to work from home & improved satisfaction
Patient Care	Robust performance

1. Cybersecurity

The looming threat of cyberattacks acts as both a driver and barrier to public cloud adoption – on one hand, the budget a public cloud vendor allocates to security is into the billions of dollars, which no hospital or radiology IT vendor could match alone. Conversely, the public cloud can also be a prime target, with healthcare providers concerned about where their data is stored and what other type of data is in the same tenancy, for example financial data, which is a high target for attacks.

The initial use case considered in line with cybersecurity, is the day-to-day operations and maintenance of the IT systems, with liability and management typically sitting with the imaging IT vendor. However, it's important to reflect on the ability to immediately react with a solution that is hosted in the public cloud. In contrast, deployment of an on-premises radiology IT system across a large US hospital network, on average, takes months; during this period, the delay to push updates and ensure security compliance can leave some providers at increased risk of attack.

> ***"The technical staff were actually relieved. The vendors took a mountain of work off of our shoulders...the quick transition to the cloud, and even since, has significantly relieved the technical burden on my staff, and it has been very, very welcomed."***
>
> **Provider 1**

One example shared by a participant highlighted the unfortunate situation whereby the institution experienced a cyberattack whilst hosting their prior radiology IT solution on-premises. To manage the situation and prevent unnecessary impact on

operations and care delivery, the organisation was able to pivot quickly and deploy a new system in the cloud within days, something not possible with the architecture of the on-premises system.

2. Provider Consolidation and Outsourcing

There were 20 acquisitions across US hospitals and health systems in Q1 2024, up from 15 in Q1 2023[1] (33% growth). This coupled with an intensifying transition towards outsourcing to imaging centres and teleradiology firms, with shifts in reimbursement and payors driving care towards outpatient facilities, is creating an increasingly complex and disparate network of providers.

As a result, the ability to have a dynamic infrastructure that allows institutions to scale usage or storage has been a driver of public cloud. During the discussions with the participants, two primary use cases were referenced:

BUDGETING FOR GROWTH

To undergo an acquisition, or any example whereby volumes will increase exponentially, the process to secure budget for large CapEx expenditure(s) could take over a year to confirm. Extensive planning and forecast modelling are required when evaluating storage requirements, to mitigate the scenario of having to unnecessarily purchase additional data centre capacity in 1-3 years.

A provider in the sample that had recently undergone an acquisition noted the ease since being in the cloud. The operational expense of a cloud system allows the need and cost to adapt seamlessly and organically as the organisation grows.

> ***"Storage investment has become a lot easier to plan, now it's just budgeting for it within our operations budget. If we're going to grow by 40TB next year, it might cost a little more based on our recharges, but it's definitely gotten a lot easier."***
>
> **Provider 3**

Although managing OpEx budgets compared to CapEx is less burdensome, it is still critical that providers understand and manage the expected monthly cost of deploying a solution in the cloud. Costs associated with image retrieval, egress or additional compute (required if leveraging AI tools) will need to be considered to mitigate the risk of an unexpected bill.

1 www.kaufmanhall.com/insights/research-report/ma-quarterly-activity-report-q1-2024

ONBOARDING NEW PROVIDERS (OUTSOURCING)

Similarly, is the outsourcing trend and the need for providers to onboard new facilities. The management of a disparate network of facilities can place pressure on on-premises architecture, in terms of managing dynamic volume, as well as ensuring performance is consistent and robust for those facilities and radiologists that are geographically distant and/or more isolated from the primary site where the data centre is located.

> ***"One benefit to the cloud is during the recruitment process, bringing new sites onboard. In particular, what the new sites are comfortable with is the scalability, [on-premise] the concern would be the ability to gain additional storage to handle more volume. Now they know we're on the cloud, it's brought comfort to new contracts, as well as existing sites."***
>
> **Provider 1**

As an organisation with a network of partners, there remains a need to manage external assurances of a cloud PACS, its performance and any implications of cost or governance for life cycle management, for example. Although cloud is increasingly discussed in the industry, there remains scepticism in terms of vendor experience, the reality of the technology (e.g., radiology IT solutions) and variability in the cloud platform providers themselves.

3. IT Resource and Priorities

The management of enterprise radiology IT platforms on-premise can be a resource intensive task for the IT department, with ongoing patching and maintenance requirements, security and system updates and fundamentally ensuring the system is running and available for the radiologists.

The initial momentum surrounding public cloud created a sense of unease in the market, with the fear whether cloud would make IT teams redundant and act as a "replacement". In reality, institutions have reported the adoption of cloud as an opportunity to redistribute resources and allow the IT team to focus on new projects or bring forward timeframes for higher priority initiatives on the IT roadmap.

> ***"One of the biggest things is we don't have to worry about managing PACS issues and the associated loss of time…From a resource planning and agility perspective, we're getting some of the time back and some of that mental capacity back, and the team can focus on better things, cooler things."***
>
> **Provider 3**

One institution shared that they were able to re-deploy the IT team that previously supported the on-premises PACS system to tackle other projects, deploying several systems on its implementation roadmap almost 6-9 months earlier than originally planned.

4. Radiologist Satisfaction

Throughout the discussions with the participants one theme was repeated: an uptick in radiologist satisfaction. This was noted as a byproduct of system performance and the increased efficiency of the working day felt across the institution.

> ***"From an internal poll of radiologists, technicians and a few AHPs, feedback was positive. Previous system crashed and required rebooting a lot, and would be one of the largest single factors for complaints. The robustness of the cloud has been profoundly positive."***
>
> **Provider 2**

Importantly for the workforce, robust performance was maintained even when working from home. This offers flexibility for the workforce, an increasing requirement from radiologists for remote reading, especially newly trained physicians. At a time when a skilled workforce is an invaluable and scarce resource, the ability for an organisation to improve user satisfaction can have unparalleled benefits for mitigation of symptoms of physician and IT staff burnout.

Longer-term, the benefits of the performance and flexibility of cloud solutions is expected to act as a benefit when institutions are recruiting for talent. At a time when demand outweighs supply, any differentiator a provider can offer to prospective employees could help attract talent. This opportunity not only applies to cloud hosting, but also aligns to offering innovative solutions that can optimise workflows and automation, for example – AI.

5. Patient Care

Many of the use cases discussed in this paper have centred on the workforce across the institution and the relief felt by the IT and clinical teams. Significantly, the improved quality of patient care was also noted by participants. A reliable and stable system during busy periods of the day improves quality and reduces the risk to patient care.

This point was emphasised in the sub-specialities that manage large and complex imaging types, such as 3D tomography in breast imaging or MRI with perfusion, whereby significant numbers of priors are required (creating massive current/prior datasets for viewing), and/or volume of images increases to 5-6,000 per scan. As imaging advances and file sizes get larger, it can place unprecedented pressure on legacy IT systems.

> ***"In general, our institution is very, very busy. There would be stalls [in the prior radiology IT system] or we would have these downtimes that were very stress inducing. Once we would be back-up and running, we could be significantly behind, and honestly, I think at some point it represented a major risk to patient safety.***
>
> **Provider 4**

As imaging advances, it's important that imaging IT solutions and vendors innovate simultaneously to ensure the effective management of large files, whilst optimising tools for the cloud environment. Without such optimisation, cost and performance of the solution could become unpredictable.

Considerations for Moving to the Cloud

Despite the benefits highlighted in this paper thus far, there are important considerations for institutions to have, ahead of undergoing a transition to the cloud to ensure it's the right strategy and time for you.

SINGLE OR MULTI-CLOUD STRATEGY?

When evaluating the different public cloud platforms, some organisations have opted for a single cloud partner, which can offer cost benefits due to economy of scale and mitigating any egress related costs by utilising multiple cloud environments.

However, there is also risk associated with a perceived "single point of failure", and ensuring the institution has a fully redundant solution to prepare for any situation. Alternatively, the institution may wish to align different priorities to different cloud environments based on services or opportunities offered.

> *"We view a single cloud as having a single point of failure, as we continue deploying solutions, that's one thing that we are taking into consideration, multi-cloud."*
>
> **Provider 3**

An enterprise strategy for the cloud is multi-faceted, and therefore may mean there is no single right cloud environment or partner. There can be risks to a single cloud strategy; however, depending on how the provider wishes to deploy a multi-cloud strategy, it can lead to additional costs and further requirements to ensure seamless management and integration of systems. A duplicate production system in a second cloud environment could become costly for a provider; however, the replication of data to a separate cloud vendor in a provider's cloud-account, stored in the coldest tier of storage, could offer a more cost-optimised multi-cloud strategy.

TRANSPARENCY OF COSTS

Cost remains one of the biggest discussion points when evaluating public cloud, although the market is increasingly understanding that cloud is more expensive than on-premises comparisons. Acknowledging that the offerings are not a simple like-for-like comparison, with additional services offered through a managed SaaS offering.

However, transparency on costs continues to be a challenge, and all associated fees for deploying solutions in the cloud. For example, are there any costs incurred for region to region transfer from a redundancy perspective? What is included in the contract and are there additional costs for services or APIs? And from a radiology IT vendor

perspective, what is the requirement for cloud infrastructure, does the vendor require multiple servers to run the application, incurring more fees? It is important for providers to evaluate and answer these questions with clarity ahead of making procurement decisions.

What's Next for the Cloud

For those institutions that have been deployed in the public cloud for several years, attention is now turning to "what's next". During discussions with the participants, there was an array of directions discussed summarised in the 3 boxes below.

"As an organisation, we're evaluating deploying a research archive and considerations around AI, now that we have our PACS in the cloud."

Provider 2

PERFORMANCE OPTIMISATION

Whilst performance has been a positive outcome for participants, there remains an opportunity to optimise processes or leverage technical services from the infrastructure, such as containerisation, as institutions evaluate the next imaging system to host in the cloud. This can be an important reality for providers, transitioning to the cloud is a journey, and a journey that will evolve as strategies mature and new technological capabilities become available.

DATA MANAGEMENT TO IMPROVE ACCESSIBILITY OF DATA

Radiology is often one of the first mission critical clinical systems transitioning to the cloud. Once available, it creates opportunities for institutions to improve the access of data across care teams, moving beyond radiology, with additional curation from the EHR, pathology, oncology or surgical IT systems, for example. The long-term intention is that the cloud can support the evolution of care models and pathways by driving a greater level of interoperability.

ASSESS OPPORTUNITIES OF IMAGING REAL-WORLD DATA (iRWD)

Building on the data management and data accessibility discussed, several participants also noted the research use opportunity presented having a data repository in the cloud. Appropriately de-identified and curated, this data can be utilised in partnership with AI companies, CROs or pharma, in areas such as AI deployment, drug development or clinical trials. Cloud infrastructure enables large datasets to become more portable and secure.

Conclusion

Aside from the buzz surrounding the cloud over the last 12 months, there are key questions providers should evaluate and consider while assessing and planning their own journey to the cloud. As first adopters conclude the first contract term on the public cloud, there is an opportunity for the market to learn from the experiences of these institutions.

Fundamentally, an institution needs to ensure that the IT infrastructure and hosting offers benefits across the teams (clinical and IT) alongside the patient. From the discussion with participants, the journey to cloud has been positive, with many evaluating their next steps and not looking back.

There remain considerations in the market that need more education to support providers transitioning to the cloud with intention; evaluating the costs, benefits and opportunities it can afford an organisation. To drive adoption at scale, the industry needs to work collaboratively, learning from early adopters of cloud deployment, alongside radiology IT vendors and cloud vendors. As has been discussed in many forums recently, the long-term shift to cloud technology for healthcare is inevitable; the "how" and the "when" have long been the more pertinent questions, though the research for this paper demonstrates that there is increasingly clarity around the important and complex nuances of cloud adoption.

All of the interviewed cohort use the Visage 7 Enterprise Imaging Platform implemented on AWS.

At Signify Research we are passionately curious about Healthcare Technology and we strive to deliver the most robust market data and insights, to help our customers make the right strategic decisions. We blend primary data collected from in-depth interviews with technology vendors and healthcare professionals, to provide a balanced and complete view of the market trends.

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