aws

Modernising patient care through digital imaging

How the cloud can help the National Health Service (NHS) enhance imaging workflows, insights and outcomes

AWS in Healthcare

Amazon Web Services' (AWS) healthcare mission is to enable access and delivery of person-centred care in order to improve outcomes and lower costs by accelerating the digitisation and utilisation of healthcare data. Our aim is to help the National Health Service (NHS) and its partners develop cloud strategies to achieve more with less, modernise technology, and digitally transform back office and clinical services.

Improving NHS Medical Imaging

Medical imaging is undergoing a digital transformation, enabled by cloud technology. AWS and its partners are supporting healthcare organisations to redesign the way in which medical imaging services are provided – improving care coordination, diagnostics and clinical decision making and reducing costs.

The NHS Long Term Plan, Data Saves Lives strategy, and NHS AI Lab provide NHS organisations a vision for harnessing data and technology like cloud storage and artificial intelligence to improve patient outcomes. Medical imaging data offers tremendous potential to drive insights, but only if imaging data is made accessible and shareable across care settings. This requires transitioning from analogue film, glass slides and physical prints to digital images stored in the cloud.

AWS delivers a secure, NHS Data Security Protection Toolkit (DSPT) compliant cloud platform to host medical images and related workflows. Healthcare organisations can consolidate storage in a central repository at a local, regional and national level, eliminating the cost of physical archives. DICOM image exchange between facilities is simplified, as clinicians can access studies from any location.

Advanced analytics, machine learning (ML) and AI modules from AWS and AWS partners can be layered on top of the medical imaging data in the cloud. Examples include algorithms to automate mundane tasks like image segmentation or flag studies for additional review. AWS's highly scalable infrastructure readily supports computationally intensive models.

Access and Collaborate

Drive better care coordination and treatment decisions with efficient, secure, and seamless integration with medical image and health information exchanges, ending system complexities and delays.
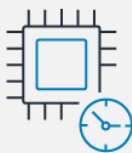
Reduce Costs

Leverage on-demand compute resources of the cloud to scale up or down based on need without paying for resource-heavy, on-premises hardware. Reduce downtime risk and meet regulatory requirements with always-updated best practices built into the cloud.

Optimise with AI/ML/Gen AI

Employ AI/ML to support anomaly detection that speeds diagnosis and improves patient outcomes. Smart automation optimizes display interactions, increases productivity, drives revenue, and improves the quality of care.

Digital Medical Imaging within the NHS

Medical imaging is a cornerstone of diagnosis and treatment across the NHS. The main imaging modalities used by the NHS include X-ray, CT, MRI, ultrasound and nuclear imaging. Collectively, NHS trusts perform around 40 million exams annually and the number of storage images is growing 5-10% each year. As the volume and complexity of images increases, imaging departments are under increasing pressure to deliver timely, accurate scans to inform clinical decisions.

Limited budgets, dated equipment and staff shortages exacerbate this challenge. While analogue X-ray remains ubiquitous for routine exams, CT and MRI are seeing surging demand due to their powerful diagnostic capabilities. Unfortunately, limited budgets mean MRI/CT equipment capability across the NHS is highly variable. Some hospitals have modern wide-bore scanners, while others operate MRI machines over a decade old with weaker magnets and slower acquisition speeds. Outdated equipment can compromise productivity and image quality. Once acquired by radiographers, images must be interpreted by radiologists. Local radiologist shortages can lead to delays in reporting, creating results backlogs for many Trusts. After reporting, images are usually stored locally on hospital servers and archived to long-term storage, including tape. Rapidly rising scan volumes are straining local storage capacity. Some trusts will soon face petabyte-scale storage needs, the costs of which are difficult to sustain with limited IT budgets.

In response, many Trusts are turning to cloud technology and digital imaging solutions to transform their imaging departments. Storing digital imaging on the AWS cloud offers unlimited, easily expandable capacity without upfront investments. All images become accessible from any NHS site rather than siloed locally. It also enables applications like AI diagnostics anywhere across the NHS to improve productivity and consistency. While data privacy and sovereignty concerns have slowed cloud adoption, solutions now exist to securely operate imaging within UK-based AWS data centres. This can allow the NHS to tap the versatility and economies of scale of the cloud, while also consolidating imaging data to harness insights.

AWS Partner Network

Leading medical imaging vendors like Fujifilm, GE Healthcare, Philips, Cimar, and Dicom Systems are now offering purpose-built solutions on top of AWS cloud infrastructure to meet NHS imaging needs. By selecting partners optimising products for AWS infrastructure, Trusts can readily transition imaging to the cloud to resolve storage constraints, improve accessibility and productivity, and lay foundations for AI-assisted imaging.

AWS digital imaging partners provide end-to-end platforms for archiving and sharing images within and across NHS organisations, built on the foundations of AWS storage and networking. For example, Fujifilm's Synapse PACS leverages AWS scalable storage to consolidate images from any modality onto a unified cloud archive accessible via zero-footprint viewers.

Partners also enable advanced analytics on AWS through machine learning services like GPU-accelerated EC2 instances. Cimar's imaging analytics taps into AWS computational power to rapidly run algorithms for tasks like lesion detection.

By building on AWS reliable, secure cloud infrastructure, these vendors deliver turnkey solutions so that NHS trusts can focus on delivering care rather than managing complex IT deployments. Solutions comply with NHS data protection policies by leveraging AWS access controls, encryption and UK data residency.

Enhancing NHS Digital Imaging with Cloud Storage

As imaging volumes rapidly proliferate across modalities like X-ray, MRI and CT, NHS hospital storage infrastructure is straining under the mounting terabytes of data. Expanding local servers to accommodate growth is cost-prohibitive. Tape backups and physical film archives also have limited space, risk degradation, and slow access.

AWS offers scalable cloud storage options that can effectively augment NHS imaging archives to reduce costs while improving retention and accessibility. Amazon S3 provides low-latency object storage suitable for images requiring frequent access such as scans from the past 2 years. Meanwhile, Amazon S3 Glacier offers ultra-low-cost long-term archival storage, ensuring images are retained according to NHS preservation policies spanning decades. Glacier archives can be accessed online through expedited or bulk retrievals.

Together, AWS S3 and AWS Storage Gateway essentially act as an unlimited capacity virtual extension for on-premise imaging storage. Current PACS systems can lifecycle images from local servers to AWS S3 once accessed less frequently. This provides rapid relief to strained local storage appliances while still keeping studies available online. For true long-term archives, images can tier further to S3 Glacier for retention durations matching NHS mandates at just pennies per GB monthly.

This storage tiering approach minimises disruption by complementing rather than replacing current PACS infrastructure. It offers NHS sites scalable capacity and geo-redundancy to strengthen continuity while reducing overhead from maintaining unused legacy archives locally. With S3 and Glacier's reliability and encryption, the AWS cloud exceeds NHS DSPT governance to securely to store and access clinical imaging records digitally for the long-term.
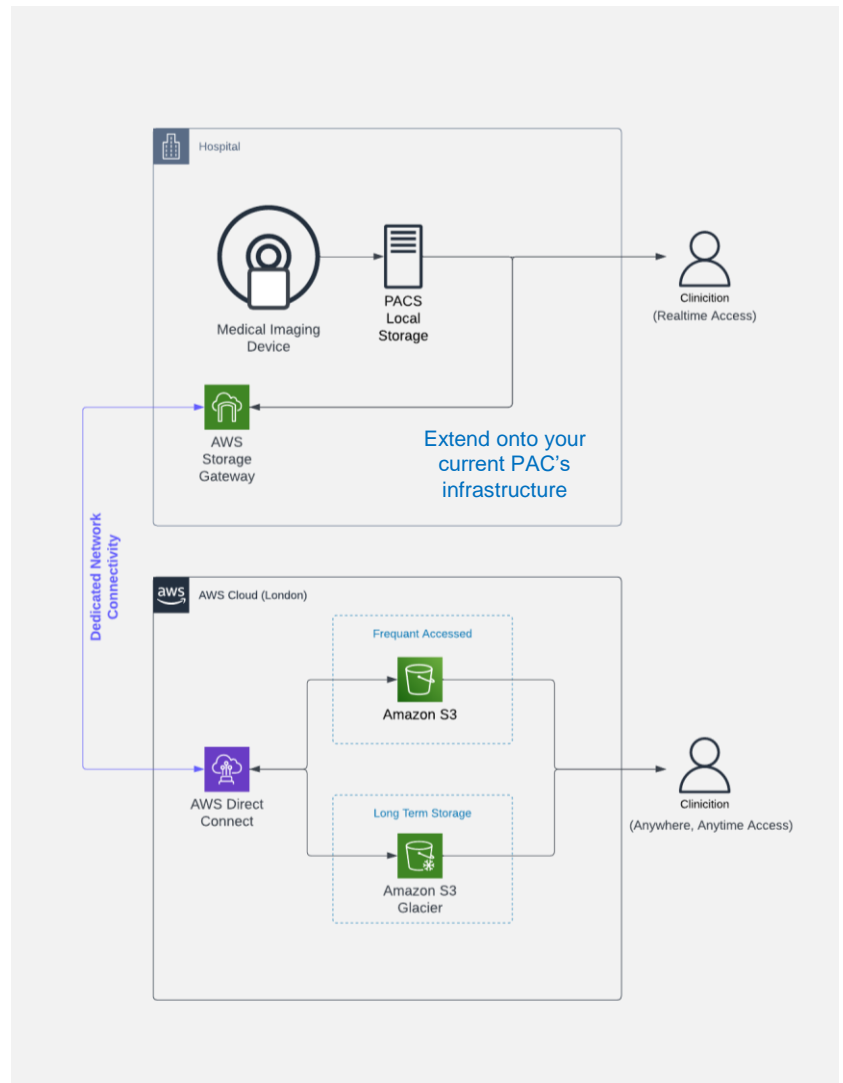
Amazon Healthlake Imaging

Amazon recently introduced Amazon HealthLake, a new cloud service designed to store, index, standardise, query, and analyse medical imaging data at scale. HealthLake provides a central repository optimised for handling billions of medical images and related metadata. By leveraging the proven scalability, durability, and security of AWS cloud storage and databases, HealthLake can readily manage the rising tide of imaging data across the NHS. All DICOM images are automatically indexed and made searchable using natural language processing, facilitating information discovery.

Healthlake further enables advanced analytics by integrating seamlessly with AWS analytics and machine learning services. This allows leveraging AI and ML algorithms to unlock insights from multimodal imaging data to aid diagnosis, treatment planning, and clinical research.

For NHS trusts struggling with siloed and limited legacy PACS systems, Healthlake offers an enterprise-wide cloud-based solution for efficiently consolidating, managing, and deriving value from medical images. By transitioning to HealthLake, the NHS can build a smart, scalable foundation for imaging ready to meet future demands and innovation in areas like AI.

Get started

To get started contact your AWS account team to learn more on how we can:

- Support you on your medical imaging infrastratucture

- Build your AWS Cloud business case

- Identify the best procurement route for your NHS Organisation

- Identify quick wins and opportunities

AWS resources

- Guidance for NHS Trusts Adopting AWS Cloud Services
- AWS Health Imaging
- AWS for Health
- Healthcare Solutions

Get in touch

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