SECTRA | Microsoft

# The future of enterprise imaging

## Harnessing the full potential of the public cloud

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# Introduction

Hospitals across Belgium and the Netherlands rank highly in Europe for their ability to deliver quality healthcare to citizens. However these regions face growing challenges: the cost of delivering healthcare has risen dramatically, with high energy prices, increasing labour costs and inflation all contributing to growing operational costs. And while demand for healthcare (and imaging services in particular) is growing, staffing shortages for both medical practitioners and IT support teams are also increasing. In the centre of all this is the patient, who faces growing disruption, delays and uncertainty.

In 2023, 34 out of 89 general hospitals in Belgium reported a combined loss of €174 million.[1]

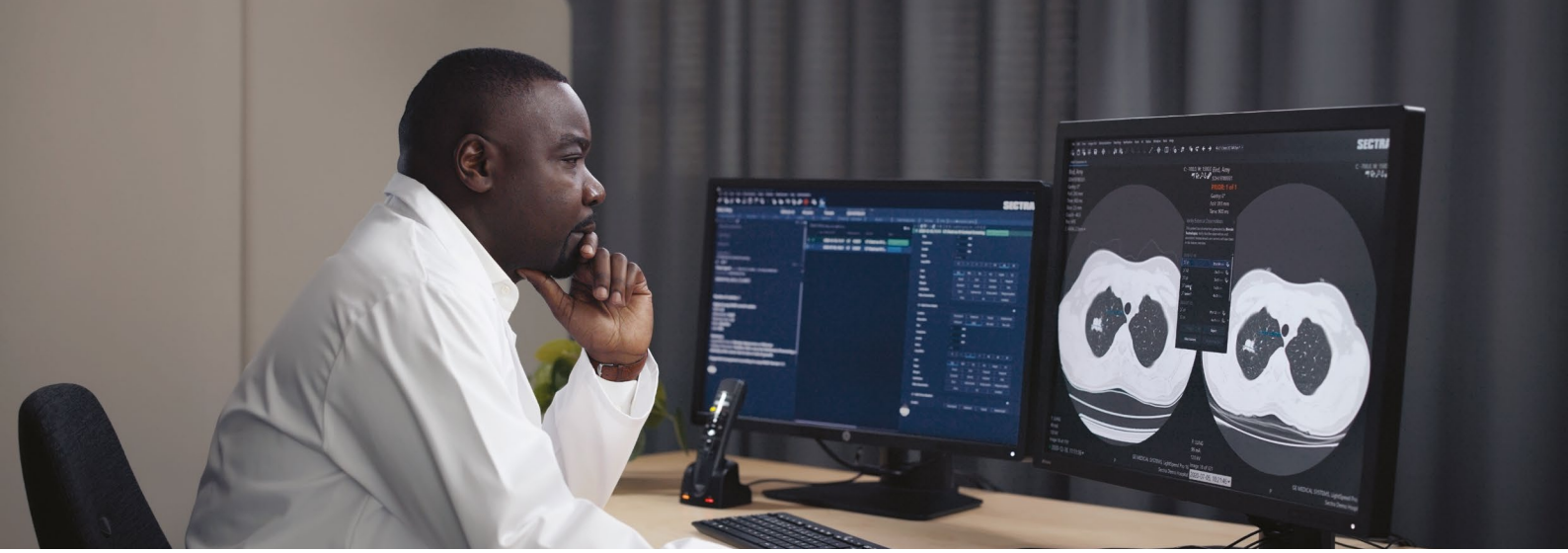
The Netherlands reported record-high healthcare job vacancies in the first quarter of 2023.[2]

But there are positives too: healthcare itself is evolving, with new AI-enabled diagnostics, increased cross-departmental and cross-provider collaboration, and the further digitalisation of health services creating new opportunities to deliver even better outcomes for patients.

All these factors combine to create a healthcare landscape that is now more volatile and complex than in the past: requiring greater levels of efficiency, productivity, adaptability and scalability on the part of hospitals and their underlying systems. This is particularly true for imaging systems, which are the cornerstone of modern healthcare delivery, particularly in relation to chronic diseases such as cancer, which are on the rise. There has been a 41% increase in cancer prevalence in Europe between 2010 and 2020[3], and projections suggest that by 2040, new cancer diagnoses in EU and EFTA countries could increase by 21%[4]. At the hospital level, improving the efficiency and productivity of imaging services used to diagnose and treat diseases like this can result in large scale cost savings – as well as improved experiences for patients.

Technology here is a critical factor: if underlying IT is disrupted, clinicians' workflows are disrupted, and patient journeys are also disrupted. If IT is inefficient, inefficiencies are magnified throughout the clinical journey and result in inefficient care for the patient. But when IT is robust, adaptable, and empowering, health services become more so, resulting in better value, and more effective healthcare overall.

1. Belgan News Agency, 2024
2. ING, 2023
3. "Complete cancer prevalence in Europe in 2020 by disease duration and country (eurocare-6): a population-based study", The Lancet Oncology, 2024
4. European Cancer Information System, 2022



## Enterprise imaging solutions

**Enterprise imaging solutions** operated in the public cloud can solve many challenges for hospitals in Belgium and the Netherlands. In this paper we will explore the specific aspects that hospitals need to consider if they are to reap the full benefits of a public cloud enterprise imaging system: how such a solution can help to relieve the administrative load on IT teams, how they can help to make imaging services more efficient and robust, and how they can be used to facilitate a more collaborative and productive workflow for clinicians.

**Enterprise imaging** has been defined as a set of strategies, initiatives, and workflows implemented across a healthcare enterprise to consistently and optimally capture, index, manage, store, distribute, view, exchange, and analyse all clinical imaging and multimedia content to enhance the electronic health record.

"Hospitals across Belgium and the Netherlands can face complex challenges by building medical imaging systems that are more adaptable and scalable – while also taking opportunities to introduce more innovation to their healthcare systems. With the right approach, the benefits can be huge."

**Bart Thielen**
Managing Director, Sectra Benelux

"We encourage you to explore this paper to understand how these technologies can address the challenges faced by health organisations today—and how they can help you prepare for the future."

**Kjetil Nilsen**
Global Commercial Director Cloud at Sectra

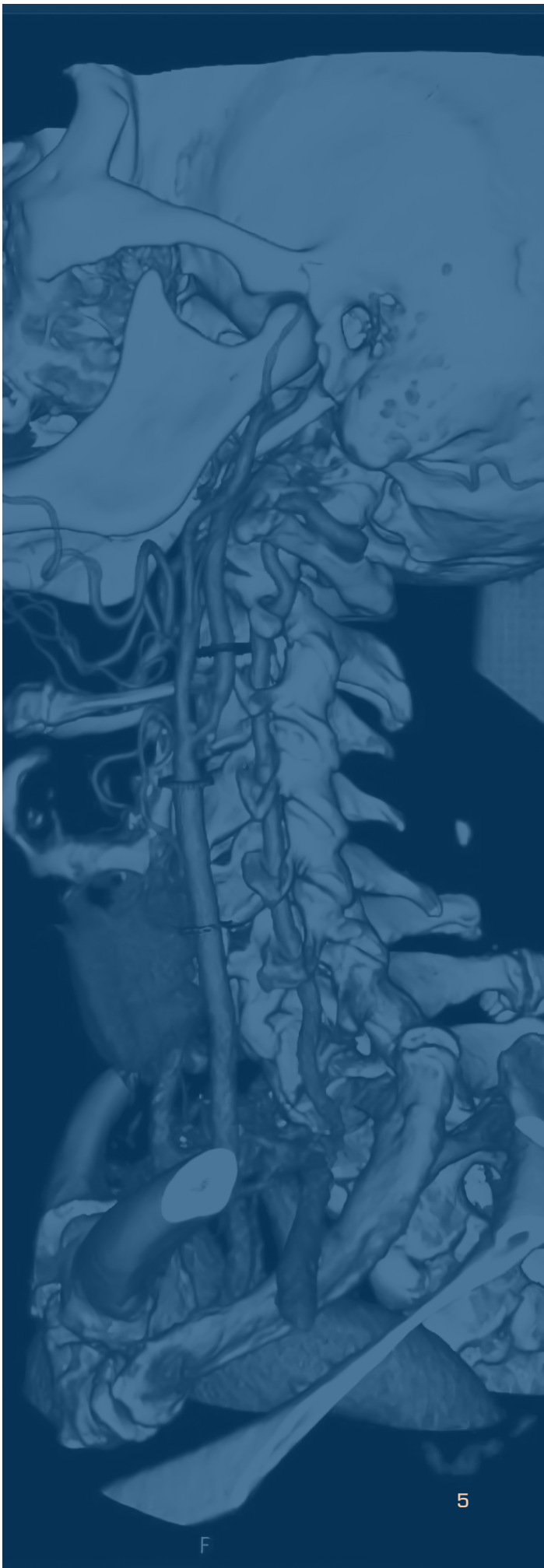
## Unpacking imaging on-premises

Many hospitals across Belgium and The Netherlands still run their enterprise imaging on-premises, as part of a traditional IT model. On-premises systems are typically favoured for the level of control they offer over security, data and connectivity. On-premises hardware can also be set up to offer the exact level of compute and storage required for imaging services, with IT teams generally feeling as though they have more control over performance and configurability.

However, on-premises systems also have some drawbacks. Maintaining hardware on-premises means holding and securing significant physical space, as well as planning for over-capacity to ensure the availability of computing resources in every scenario. IT teams must take full responsibility for the day-to-day availability of the system, as well as the appropriate upgrades and patches required to keep it operational. In addition, storage needs for production and archiving must be projected, often over a period of five years, meaning scalability can be limited by the original hardware purchased.

For imaging systems in particular, disruption is a key issue. If systems need to be taken offline, patients and practitioners are affected. This could happen in the event of a system upgrade or a security incident. In an on-premises scenario, IT teams will be against the clock to get systems up and running again. This can happen on a much grander scale if a hospital is consolidated or restructured, or if it wishes to collaborate with another (such as through a shared PACS). Modifying or consolidating physical hardware can be a considerable challenge, and with limited resources, timelines for projects can be long and costs can be high. Complexity is further magnified if the hospital runs several different diagnostic systems through separate vendors, each of which must be managed and maintained individually.

On-premises imaging systems are robust, but they are also inflexible and complex. Hospitals rely heavily on their IT teams to keep these systems operational; as challenges within the region grow, IT teams must take steps to safeguard the resilience of their hospital's imaging systems – through streamlining workflows, minimising the risk of disruption, and building a system that is more flexible, adaptable, and scalable.



## Solving emerging challenges with public cloud

Financial struggles have become apparent for several hospitals across the Netherlands and Belgium in recent years. Two major hospital groups in the Netherlands were closed due to bankruptcy in 2018, and in 2023 it was announced that two other hospitals would be closed as part of their owner's financial restructuring. In addition, it was reported that four in ten Belgian hospitals made losses in 2024, after reporting record losses in 2022.

These financial pressures place a high priority on improving the efficiency of imaging services and improving value per patient. This will involve improving the productivity of clinicians by improving the speed of their workflows, ensuring access to key systems and minimising disruption. Care should also be taken to minimise costly security breaches – particularly in regard to ransomware, which has become a growing threat.

IT is fundamental to supporting workflow challenges, however complex on-premises models can make this more difficult. Having multiple vendor systems strains IT and resources, and results in additional security risks and disruption if systems aren't consistently maintained.

In addition, fragmented IT can affect the productivity of clinicians if images can't be easily retrieved or shared by the required parties – which may result in a patient needing to undergo repeat scans. All these things combine to create a more drawn-out patient journey, and an increase in treatment costs.

Enterprise imaging systems can address these issues in multiple ways, first and foremost by streamlining underlying infrastructure to reduce the administrative burden on IT. In an enterprise imaging solution running in the public cloud, physical hardware is operated by the cloud provider and software is maintained by the vendor.

Infrastructure can be further streamlined by adding multiple imaging disciplines onto one single system, giving IT only one system to secure and monitor. Rather than making IT teams redundant, this allows them to move into more supportive roles for clinicians and their PACS, freeing up valuable time to focus on new, value-driving initiatives. It means that they will become both more visible, and more valuable to the teams they support.

## On-premises vs cloud models

### On-premises

The healthcare organisation owns and is responsible for the hardware itself, as well as control of data and operations. It is stored either on the premises of the organisation itself, or in an owned data centre.

### Private Cloud

A private cloud is operated for sole use of a single organisation by either the organisation itself or a third party. The cloud provider is responsible for the infrastructure but not for the control of data. It can exist both within the hospital's network or off-premises.

### Public Cloud

Cloud infrastructure is operated by a cloud provider on behalf of multiple tenants who share resources. The cloud provider is responsible for both the cloud infrastructure and the control of data and operations within the cloud. It typically exists across a series of networked data centres.

Public cloud has additional benefits in the way of agility and scalability. New imaging systems that might take months to provision in an owned-data centre might take mere weeks in the cloud, as compute and storage capacity can be provisioned without the need to consider physical hardware. This means that new capabilities can be added into clinical workflows much more quickly. In addition, new diagnostic sites can be established much faster, even offering a neutral shared resource for hospitals who wish to collaborate, where no one hospital needs to house or manage the system.

In summary, alongside efficiency gains, enterprise imaging in the public cloud can improve a hospital's ability to react, adapt, and evolve in the face of growing financial challenges.


Reference case

# AZ Sint Lucas and AZ Sint Jan, Bruges

Facing staff shortages in a period of increased demand, the hospitals of AZ Sint Lucas and AZ Sint Jan in Bruges had already begun to collaborate on radiology in 2021 as a way to share a demanding workload between specialists. However, underlying IT was making this collaboration difficult. The hospitals used two different PACS providers, making it impossible to work in one environment and slowing down the speed at which images could be shared and assessed.

The two hospitals signed a deal in 2023 to implement a new fully-managed public cloud solution with Sectra. This swaps out the two older PACS systems with one, state-of-the art communal PACS system to help streamline workflow and improve efficiency. The system is scalable and modular, with a VNA at its core, to allow the hospitals to expand its use into other diagnostic areas, and across more partners in the future. The service is based on Microsoft Azure and fully managed by Sectra to relieve the burden on internal IT staff and resources.

This new system, used by 23 radiologists and 9 trainees, provides a unified strategy for both hospitals' imaging needs while lowering operational costs. It also offers the required scalability and security to help them be more adaptable in the face of fresh challenges, without demanding too much from internal IT. The fact that it is a fully managed service, deployed in the cloud means that application managers have more time to focus on the care of patients, rather than on the maintenance of the IT-system and the storage and accessibility of data.

"The new system has already enhanced our ability to share resources and collaborate on patient cases. The ability to tailor our workflows has also greatly benefited our radiologists, especially for overarching multidisciplinary team meetings"

**Dr. Pieter Vandaele**
Head of the Department of Radiology at AZ Sint Lucas

Find out more in the press release here

## Addressing clinical challenges

In healthcare, system failure and resultant data loss expose patients to unacceptable risk and although total system failures are rare, smaller-scale downtime or delays of sub networks or systems can cause significant disruption.

To support clinical workflows, it is essential that underlying systems are stable, accessible and responsive, and that clinicians can work productively, with access to the right images exactly when they need them. This requires careful management of the underlying infrastructure – ensuring loads are balanced, and that the network, operating systems, databases and storage have enough capacity for the tasks at hand. If this isn't adequately handled, systems can slow, and clinical workflows become disrupted.

In a public cloud model, the system can be set up to synchronously replicate data to several data centres at once to ensure availability of the system. This means that if one data centre is compromised or lacks capacity, no data or access is lost and the system operates as normal while the issue is resolved, or data is re-routed. By ensuring network availability, the latest cloud-based imaging solutions allow even the largest images – such as 3D exams – to be opened in just a couple of seconds, and by different parties in the network.

### Integrated diagnostics

The consolidation of multiple imaging and diagnostic solutions into one PACS can also help to further accelerate clinical workflows by making it much easier for inter-disciplinary teams to retrieve and share images. This can help to support the productivity and efficiency of multi-disciplinary meetings, and provide a more complete set of a patient's data to improve diagnosis and build more effective treatment plans.

Public cloud supports this approach through its scalability, as additional capacity can be easily added to the system to handle the extra load.

## Digital pathology

Public cloud has additional benefits in the way of agility and scalability. New imaging systems that might take months to provision in an owned-data centre might take mere weeks in the cloud, as compute and storage capacity can be provisioned without the need to consider physical hardware. This means that new capabilities can be added into clinical workflows much more quickly. In addition, new diagnostic sites can be established much faster, even offering a neutral shared resource for hospitals who wish to collaborate, without requiring any single hospital to host or manage the system.

We can see one such example of the benefits of public cloud in digital pathology – where images are scanned, shared and interpreted through digital images rather than on glass slides through microscopes. Digital pathology helps hospitals to better utilise specialists, but requires a far greater level of compute and storage capacity due to the sheer size of the images produced: up to 10-100x larger than those of radiology.

Long-term digital storage of pathology images hasn't been viable in the past. For labs storing cases for a long time, the cost of storage has typically been the costliest item in digital pathology, especially as the storage cost aggregates over time. However tiered cloud-based offline and nearline storage has made this much more affordable, allowing hospitals to pay only for what they need instead of over-dimensioning their on-premises hardware. Cloud-based digital pathology improves scalability, with hospitals able to scale up the production and storage of images over time as required.Storing the digital images has additional benefits; historic cases become available for the diagnostic process and are far easier (and cost-effective) to retrieve than physically transporting a glass slide, and the images do not degrade, unlike the physical matter in a glass slide. This also allows historical images to be kept and retrieved to support wider research initiatives.

## Multi-tiered storage

| Tier 1 | Tier 2 | Tier 3 |
| --- | --- | --- |
| High-speed access, more expensive. | Adequate speed of access, lower cost. | Lowest cost, offline archive, available on request. |

In tiered pricing models, such as Sectra's three-tiered storage, images are held only for a short time (typically a few weeks) on a more expensive image cache, before being automatically archived to cheaper storage once they have moved beyond initial use. After a more significant period – typically after a year or so – they are effectively moved into offline 'archived' storage, again at reduced cost. These images can be easily retrieved by labs at a later date – allowing for their use in unique medical history cases, medical legal investigation, research, or training.

In summary, alongside efficiency gains, enterprise imaging in the public cloud can improve a hospital's ability to react, adapt, and evolve in the face of growing financial challenges.

## Addressing security needs

Data security remains one of the highest priorities for healthcare organisations worldwide. In healthcare, data loss has devastating real-world consequences that puts patients at risk. There is no acceptable loss of patient data: it must always be retrieved. This is possibly why healthcare organisations are so disproportionately targeted by ransomware attacks.

**A 2023 report by the European Union Agency for Cybersecurity indicated that 42% of all reported ransomware attacks were targeted at hospitals.**

### Ransomware mitigation

Ransomware attacks work by locking down crucial data – literally 'holding it to ransom'. For healthcare operators, these attacks are very serious and can cause disruption to critical services, as compromised systems must be taken offline. Restoration can also take a long time, resulting in further delays for patients.

Cloud solutions can help to mitigate ransomware attacks in a number of ways. In the event of an attack, data can be automatically replicated to a separate, isolated location. Pockets of data are kept separate from each other and uniquely secured, limiting the reach of an attack, while also providing a smaller amount of data to be restored.

Backups are also crucial for restoration and as such, are also targeted by attackers. Sectra itself replicates enterprise imaging data to Microsoft Azure Availability Zones to safeguard against this. These zones are stretched across multiple data centres making data available in the case any of the zones are lost. In the event of an attack, these can be quickly recovered. In Sectra One Cloud, database backups are performed daily, and data loss is minimised to no more than 10 minutes.

### Shared security expertise

Any kind of hardware is a potential failure point. The more hardware, the more maintenance, and the higher the risk of maintenance being missed. The most obvious benefit of a full-stack enterprise imaging solution in this scenario is that hardware is largely secured by the vendor. Although some security aspects (such as identity and access management (IAM) and security configurations) are still handled by the customer, basic system patches and upgrades are automatically handled by the enterprise imaging provider. They also provide tools to help customers manage security, such as IAM and logging tools.

Sectra One Cloud can strengthen the security profile of healthcare organisations by offering security at the application level, for which it conducts regular code reviews, vulnerability testing, and penetration testing: encrypting network traffic and applying strong access controls to ensure data protection. It also offers strong isolation between customer systems to make sure not data is inadvertently leaked and conducts network monitoring to both detect and trace any suspicious activity and ensure data continuity.

Because the business model of a public cloud rides on its ability to secure its environment, providers invest heavily in security resources: far beyond the scope of what a healthcare organisation could invest on its own or maintain in-house. Sectra itself leverages this investment: alongside 30 years of its own experience in cyber security for critical systems, it also takes advantage of the $1 billion of cyber security that Microsoft invests annually in its Azure public cloud to provide multi-layered security. The Azure platform is used and trusted by 95% of Fortune 500 corporations and is supported by more than 3,500 Microsoft security experts. Its data centres – leveraged as part of the Sectra One cloud solution – are built to be physically secure.

## Security and data protection

Healthcare providers throughout Europe are navigating a complex security and regulatory landscape. In such an environment, many take a stance of protectionism and an overly cautious approach to SaaS, but this prevents them from capitalising on some of the key opportunities of cloud. To succeed, health organisations must find the right approach – protecting what's critical, while fully harnessing the power of the public cloud to drive growth, innovation, and resilience.

Sectra and Microsoft are fully committed to working within current regulations and closely monitor new developments to ensure that customer control over data is robustly protected. Sectra leverages world-class Microsoft expertise and Azure technologies to ensure compliance and resilience. The achievement of the STAR LEVEL 2 certificate underscores its commitment to stringent security standards.

Sectra is ISO27001 (information security), and ISO27017/18 (cloud security) certified, as well as HIPAA and GDPR compliant, ensuring that data security meets the stringent regulations of the EU, and respects rules relating to data sovereignty. Additionally, Sectra has developed a multi-layered cloud security framework to safeguard customer and patient data, as well as a comprehensive compliance and certification framework that not only meets, but often exceeds, industry standards across the markets it operates in. We continuously monitor evolving regulations and requirements to ensure customers remain compliant with the latest standards and legal obligations.

Microsoft has also taken steps to support European transparency, privacy, and control through its EU Data Boundary Solution. By balancing sovereignty requirements with public cloud adoption, customers can optimise their investments – getting the ROI they need without overspending on tailor-made solutions that may limit their flexibility and ensuring that their services remain available, reliable, and strong no matter what happens.

## Getting the best value from the public cloud

In most cases, IT teams will find cloud infrastructure cost-comparative at the basic level. But viewing a transition to public cloud as a like-for-like cost-saving exercise is misguided; its real benefits lie in its transformation of the IT operating model to make it more cost-predictable, adaptable and resilient to external changes.

### Achieving flexibility with robustness

Public cloud allows hospitals to build imaging services that are both flexible and robust. 'Flexible' in this regard means being able to quickly deploy new imaging technologies that are easily incorporated into existing workflows. It also means having the capacity to integrate multiple imaging sites, and even multiple disciplines, onto one consolidated system to aid secure data sharing and the provision of more holistic, integrated care pathways.

However alongside this flexibility, services must also be resilient. To be effective, imaging infrastructure also needs to be available, secure, manageable and affordable. To make this happen, its complexity must be minimised, and benefits must be scaled to achieve greater economy.

### Sharing the administrative load

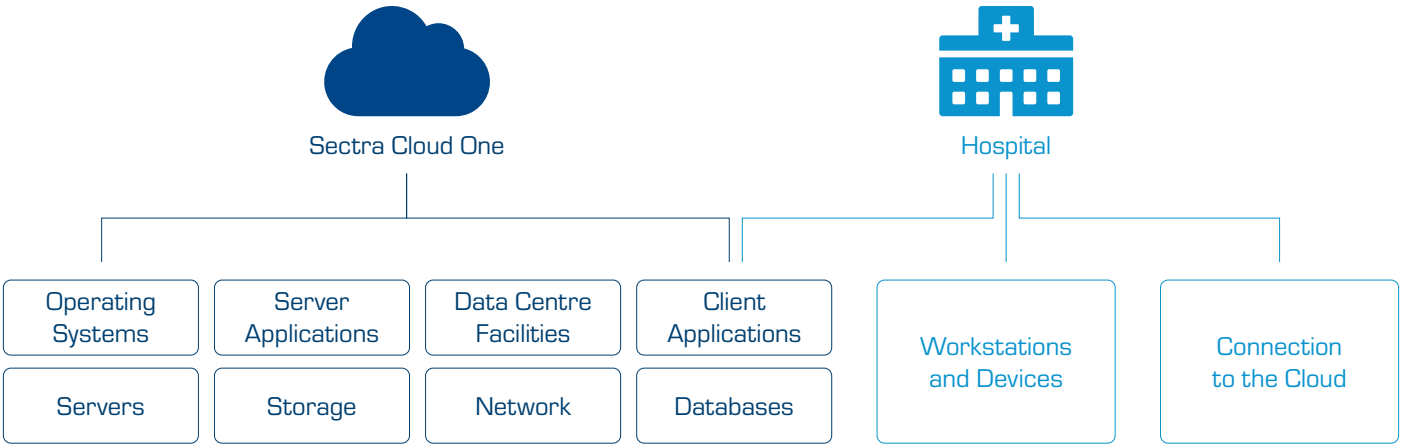
Sectra is helping hospital IT teams to build flexible and resilient imaging infrastructure by providing a solution that delivers not just the adaptability and scalability of public cloud, but also the robust security, availability and governance mechanisms to ensure the system remains manageable and affordable as services evolve.

The Sectra One Cloud solution – offering infrastructure, imaging software and security as a single packaged subscription – aims to deliver a quality of service beyond what can be achieved using existing hardware and resources, with benefits stretching far beyond basic deployment costs.

In this model, infrastructure is built on scalable frameworks, allowing new solutions to be deployed on standardised hardware, and allowing IT resources to be allocated and deallocated automatically through APIs. This allows IT to administer a streamlined introduction of new capabilities, such as AI diagnostic tools, into existing practice workflows.

## Clear division of responsibilities

The hospital remains responsible for the connection to the service, its devices and the software it chooses to use. Sectra takes care of all the resources in the cloud required to provide you with the service.




Minimising administrative responsibilities for IT staff through shared infrastructure models can help to manage staffing costs, as well as free up skilled IT personnel to better support users and additional high-value transformative projects. Additionally, IT teams will no longer need to source and house additional compute and storage when new diagnostic centres are established.

These consolidated care systems can have huge impacts on the cost of care delivery, the retention and best use of specialist IT staff, and the eventual outcomes for the patient: faster diagnosis through more connected diagnostic systems, better access to care professionals who work with greater productivity, and less exposure to multi-scan risks through better image sharing networks.

## Preparing for enterprise imaging in the public cloud

Moving imaging services to a public cloud operating model isn't always a simple transition. To ensure timely adoption, hospitals must first undertake steps to understand what data needs to be migrated, and which systems need to be retired or replaced, as well as reviewing their network architecture to make sure they have a secure connection to the cloud with the necessary bandwidth to support their operations. It is recommended that any hospital IT team wishing to take advantage of the public cloud first undergoes a cloud assessment before committing to adoption timelines.


Reference case

# Zuyderland Medical Center

Sectra have worked with Zuyderland since 2017, where it replaced two separate IT environments for reviewing radiology and nuclear medicine images into a single common system. Following a further engagement to introduce a digital pathology solution in 2020, Zuyderland again engaged Sectra in 2023 to migrate its existing Sectra solution to a cloud-based solution in Azure, with the aim of achieving greater scalability and reducing the maintenance burden for IT infrastructure on its internal resources.

Sectra delivers its enterprise imaging solution as a cloud service, Sectra One Cloud, which provides Zuyderland with a consolidated system for radiology, breast imaging and orthopaedics, in a secure and fully managed cloud environment in Microsoft Azure, with Sectra assuming responsibility for the technology and operation of the system.

Sectra is seeing increased interest in cloud services as healthcare providers like Zuyderland continue to battle high workloads and a lack of resources, and new collaboration initiatives, aimed at improving patient experiences and outcomes, place even more importance on secure communication and the sharing of sensitive data. Adopting a fully-managed cloud solution means that the healthcare provider can devote more time to its core business – rather than its operational IT— to offer the best possible patient care.

"We've been a happy customer of Sectra for many years, so letting them take full responsibly for our IT operations was an easy choice. Moving to the cloud will reduce our IT burden, giving us the time to focus on our users."

**Ralph Berendsen**
Medical Physicist at Zuyderland Medical Center

## Conclusion

Adopting cloud today to reap benefits tomorrow

> "By nature, a cloud solution comes with new value-added benefits and the supplier takes a bigger responsibility. Just comparing costs is not enough: the key is to understand the total value created."

**Kjetil Nilsen**
Global Commercial Director Cloud at Sectra

Medical imaging is a constantly evolving field with AI and enhanced imaging databases opening up new avenues to support the work of clinicians; speed up the path to diagnosis, treatment and long-term recovery; and create more positive outcomes for patients.

Hospital IT teams are the hidden heroes in this story. As in the cases of Zuyderland, AZ Sint Lucas and AZ Sint Jan, a new approach to IT has the power to make transformational change in the way hospitals can provide for their clinicians and patients. By making secure, adaptable and scalable enterprise imaging a possibility, IT can help to streamline workflows, accelerate the adoption of cutting-edge capabilities, and better protect patient data.

Sectra is supporting IT teams by removing complexity from the underlying tech stack. By supplying a single contract comprising infrastructure, imaging software, and security as a single packaged subscription, Sectra is helping IT teams to manage increasing IT demands, while also helping them to provide an efficient, future-ready foundation for their organisation.

A full-stack SaaS enterprise imaging solution, delivered by a vendor that can fully utilise the benefits of the public cloud, can enable the scale, breadth and adaptability needed to ensure hospitals across the Netherlands and Belgium, remain resilient in challenging times. As a company specialised uniquely in enterprise imaging, and with a 20-year relationship with Microsoft, our deep understanding of the capabilities of the Azure platform can help these regions to unleash the true power of the public cloud – in a way that is safe, economical and fit for the future.

Speak to one of our regional experts to further explore how Sectra can help you remove unnecessary friction from your medical imaging services.

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