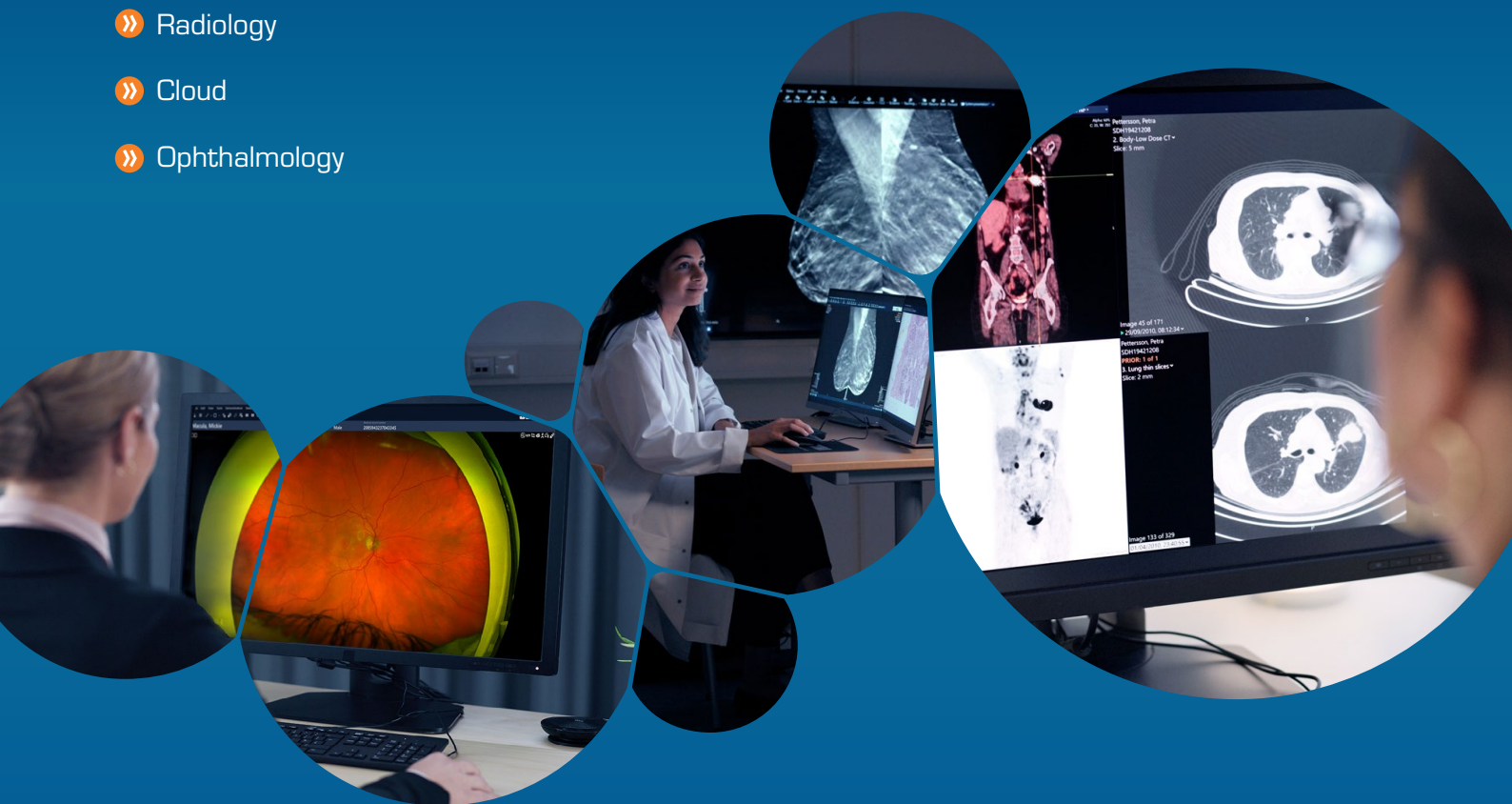


This is Enterprise Imaging

Central to managing medical images is a single IT platform—an enterprise imaging system—that tightly integrates and displays all types of images for all kinds of physicians.

This magazine covers the following:

- » Enterprise Imaging
- » Radiology
- » Cloud
- » Ophthalmology



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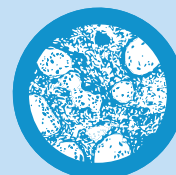
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Enterprise Imaging

More and more healthcare systems are moving from multiple PACS to a single enterprise imaging system, where images from multiple 'ologies live in a central location in a vendor-neutral format. Learn how that shift is busting siloes and deepening integration.

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Radiology

Radiologists are being spread thin, perhaps more so than ever—which is why the ability for them to make speedy but accurate decisions is such a game-changer. Thanks to fewer clicks, fewer sign-ons, and streamlined workflows, radiologists using enterprise imaging are getting more done, better and faster.



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Cloud

Skyrocketing image volume and an increased need for collaboration across multiple and geographically diverse sites has made image management far more complex. For many healthcare systems, secure, always-on cloud storage—paired with fully managed services—is the right answer.



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Ophthalmology

It's easy to see why ophthalmologists are joining the enterprise imaging revolution. Making the switch is a simplifier, time-saver and confidence-builder, moving them from modality specific workstations to an all-in-one, multimodality, integrated viewer and storage option.



This is Enterprise Imaging

By Mary C. Tierney. Featured in Health Imaging, March 2022

First there was PACS: picture archiving and communications systems. Over the last decade, as managing medical imaging has expanded far beyond radiology, enterprise imaging was born. But what is enterprise imaging in its best form?

Once a noun, enterprise imaging is now a verb; an action word that means enabling and optimizing workflow and patient care by capturing, analyzing, AI-enabling, routing, prioritizing, fetching, viewing, integrating, managing, securing, reporting, exchanging, archiving and governing clinical images, photos and multimedia content from multi-ologies to enhance the electronic medical record (EMR). And at the same time, providing high-performing diagnostic tools to physicians such as radiologists, cardiologists, pathologists and orthopedists. It's become a lot more than archiving and communicating.

The mission of enterprise imaging is to unite all images and data. Physicians and caregivers can view and diagnose, offer insight, share opinions and make informed patient-care decisions. Workflow is patient centric.

Enterprise imaging connects once-separate information siloes across multiple 'ologies to enhance the entire journey and workflow for physicians and caregivers who need images and access to the EMR to guide decisions on patient care.

In a well-designed IT infrastructure, the EMR can call up enterprise imaging viewers to display images and the other way round. All behave as one seamlessly integrated desktop optimized for individual physician's needs.

Central to this is a single IT platform—an enterprise imaging system—that tightly integrates and displays all types of images. Just as the EMR is the source of truth for everything patient data across a health system, enterprise imaging, the “pixel EMR” as some call it, is the source of truth for everything imaging.

“We’re seeing a similar trend in imaging that we saw many years ago when CIOs wanted to move away from separate information systems such as RIS for each department in the hospital,” says Torbjörn Kronander, PhD, MSEE, MBA, president and CEO of Sectra. “Those systems were expensive and physicians couldn’t get what they wanted from them with any kind of efficiency. The solution turned out to be one EMR for the enterprise with modules for the different departments. Today, healthcare leaders and IT folks tell us the fewer the systems, the better for imaging too. Having many IT systems is complex to manage and very costly to own and operate. It also increases cyber security risks, as no chain is stronger than its weakest link, and all these systems must be secured instead of just one. Health system leaders want to improve accessibility to imaging as they did with EMR data, and thus performance, while reducing complexity, burden on IT staff and definitely, cost.”

“Enterprise imaging is so much more than a central archive. What’s important is how the data lives, not where it lives. What matters is what physicians, clinicians and health systems can do with the information they have and learn from it. Enterprise imaging is about the efficient activity and actions it facilitates.”



Torbjörn Kronander, PhD, MSEE, MBA, President and CEO, Sectra





Building a foundation

For these reasons and more, an increasing number of health systems large and small have moved from multiple PACS to one enterprise imaging system—or are implementing or planning for a change.

Many enterprise imaging systems today are already integrating radiology, breast imaging, nuclear medicine and cardiology, and increasingly orthopedics, pathology, dermatology and ophthalmology. Some also include endoscopy, mobile apps for POCUS and photographing wounds and burns.

The backbone is either a stand-alone vendor neutral archive (VNA) or a full-fledged enterprise imaging system that manages and stores images in a vendor-neutral format, acting to the outside world as a VNA. The second is the stronger option, says Isaac Zaworski, president of Sectra U.S. “The VNA only stores data and storage is not enough. It’s the capturing and storing of data in a structured way, enabling access and getting the data to the end users, and then providing effective workflows in the clinical process, that are critical.”

Think of it this way: All kinds of images need to be indexed the same way in the same system for a physician to be able to access and analyze the full picture of a patient. It is the system that brings all the image data together, cleans, normalizes and hosts it in such a way that it is discoverable and accessible. Linking together that key information in the background differentiates enterprise imaging from a VNA. The enterprise imaging system is the foundation upon which you build everything else because it provides a more comprehensive and more efficient workflow than a VNA approach.

In both instances, images live in a central location in a vendor-neutral format. They include medical images, videos, and audio clips. Among those are all types of DICOM images, ECG, HD film, non-DICOM images and whole-slide digital pathology images.

Images may be DICOM-wrapped or kept in their original format so IT teams can choose the optimal strategy for each department and workflow. Since images, and other multimedia, are only stored and accessed using standards such as, DICOM, HL7, DICOM web and XDS, they can be accessed by any standards-compliant application. This helps avoid the need for future data migration projects.

“In a situation where you have all these different data types, the tighter integration of an enterprise imaging system becomes really valuable,” Zaworski says. “It is the tighter integration that enables all of the real-world benefits in an enterprise environment because current data and interface standards are just not there to support it all. Yet, anyway.”

Kronander nods in agreement. “Enterprise imaging is so much more than a central archive,” he says. “What’s important is how the data lives, not where it lives. What matters is what physicians, clinicians and health systems can do with the information they have and learn from it. Enterprise imaging is about the efficient activity and actions it facilitates.”



A positive user experience

On the front end, consolidating multidisciplinary images and multimedia offers more simplified and near-instant access for physicians and caregivers. Workflow orchestration and automated triage, for example, route exams to subspecialized physicians in neuroradiology, musculoskeletal imaging or pathology. Clinical workflow and patient outcomes improve too.

The enterprise imaging system delivers the reading and review tools that various physicians need with each exam. Advanced visualization tools offer native 3D, mammography, nuclear medicine, oncology and orthopedics for specialists who need them. Similarly, native integration within the enterprise imaging system allows for worklist

prioritization, automatic lesion detection and CAD marks. Other tools help to speed workflow, namely anatomic linking, lesion tracking, cell counting and/or volume measurements. Instant messaging and chat also are helpful in linking physicians, technologists and nurses—not the least in getting second opinions from ultra-specialized colleagues at other locations.

“The application layer—the end user experience component—needs to be flexible and modular enough so that no matter what the physician’s specialty is the application is tailored for his or her specific needs and workflows,” Zaworski says, “while linking back into the underlying enterprise image management system and EMR.”

Enterprise imaging also delivers AI apps seamlessly embedded within physician workflow, normally through a marketplace delivered by the EI vendor. An open-systems approach allows health systems to choose vendor-supported AI applications that have already been tested, validated, integrated and are vetted as for cyber-security. Collectively, AI apps allow physicians to focus on exams that their expertise brings value to and leave behind tasks computers conquer faster than humans.

“Enterprise imaging really guides everything from the workload being distributed equitably to routing images to AI and making sure access is secure only to people who need it,” Zaworski says. “Tight integration between the report and images allows image links so the physician can tell the story and offer the report with measurements and pictures. It’s the structured data that allows physicians and administrators to look at trends over time.”

[Read this article](#)

Hospital for Special Surgery, New York City

The path to digital pathology: IT-enabling image and report access across the enterprise

The many benefits of enterprise imaging

With enterprise imaging comes a solid strategy for enhancing patient and caregiver experience, improving population health, and reducing complexity and cost. There’s also a commitment to improve quality of care and patient safety as well as reduce of cybersecurity risks of all imaging data.

Informed business analytics, common for all imaging, offer insights and trending, thus driving smart decision-making across health systems clinically, operationally and financially.

For the radiologist, enterprise imaging improves workflow and ensures all images, systems and data are connected. This means access to the full imaging record customized by specialty and the full EMR in one view.

Bringing technology together also brings people together. Decision-making is more informed and lead times tighten from diagnosis to care. Referring physicians and surgeons benefit from deeper access to information and patient care and patient experience is better too.

“A tight integration between all types of images as well as the EMR allows physicians in tumor boards to display pathology, radiology and dermatology images side by side on one system,” Kronander says. “For example, with a breast cancer patient, the physicians can view mammograms, ultrasounds and MRI along with pathology. They are more confident they have all the information they need to make important and often, complicated, decisions. For the patient outcome, that is a large advantage.”

When it comes to educating patients, physicians can pull up all images, videos and multimedia at the bedside or in the office. Patients become partners and shared decision-makers in their own health.

Enterprise imaging also brings productivity surges across caregivers and departments. In moving away from the complexity of maintaining multiple and redundant IT systems, costs can decrease for a long list of things: care, operations, IT staffing, hardware, data storage, software licensing, cybersecurity hardening and services. Server costs can be shared across more departments. EMR integrations can be limited to be between two systems instead of many. Operating costs are often slashed and can be managed in a software as a service model. Think greater simplicity and better outcomes for CIOs and IT staff, better usability for clinical specialists and more flexibility for health systems to acquire new technology without large capital investments.



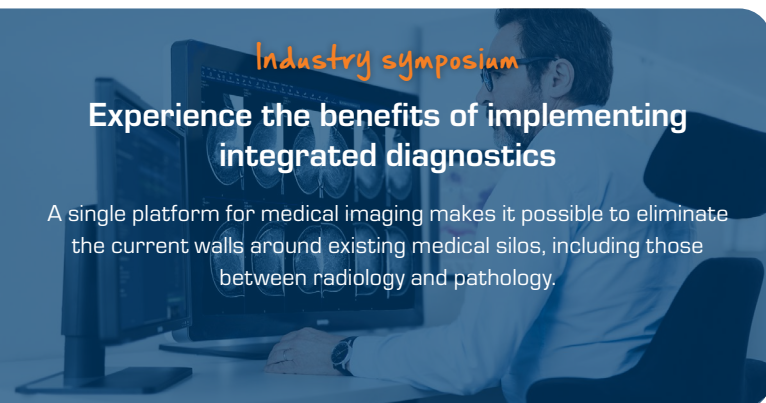
“Enterprise imaging really guides everything from the workload being distributed equitably to routing images to AI and making sure access is secure only to people who need it. Tight integration between the report and images allows image links so the physician can tell the story and offer the report with measurements and pictures. It’s the structured data that allows physicians and administrators to look at trends over time.”

Isaac Zaworski, President, Sectra U.S.



With fewer and more secure IT access points, risk is similarly reduced thanks to greater data security. Staff no longer worry about putting patches in place ASAP, cyber updates or cyber security attacks. And in some instances, lost imaging revenue can be found by connecting devices to allow billing.

The benefits are powerful now but they're also paving the pathway for the integrated diagnostic vision of the future: personalized medicine. "How we actually bring the data together and structure it in the context of a whole patient and add in AI is a one-two punch that is going to start to pay dividends for health systems," he says. "Right now, there's a massive amount of noise around algorithms trying to outperform humans. That's never going to show value. But as soon as we all start linking together multiple disciplines and allow the algorithms to search for trends across disciplines, we're going to start seeing results that we don't have today. And add to that genomics, proteomics, other heuristic remotely sensed data. This is the real story from an enterprise imaging standpoint. And why a VNA is just an archive that cannot accomplish these benefits. The images, the EMR, structured in one system for all touchpoints in a whole patient jacket. This will allow the best view of individual patients and is the building block healthcare needs to push care and research into the future. Enterprise imaging is central to making that happen."



A single platform for medical imaging makes it possible to eliminate the current walls around existing medical silos, including those between radiology and pathology.

Enterprise imaging moving to the cloud

Enterprise imaging should be ideally implemented in the cloud, but is not necessarily cloud-enabled. A decade from now all systems will include a cloud component because of all the benefits they offer. In a fully managed cloud service, vendors, not IT teams, handle hardware, software, upgrades, scalability and security. That includes taking full responsibility for storage, compute and a guarantee on cost for cloud infrastructure. That allows providers to concentrate on what they know best: taking care of patients.

"By implementing a well thought out enterprise imaging strategy," Zaworski notes, "you're doing all the legwork to create an architecture that's prepared to support the future in a way that will be more economical."

Radiology: This is Enterprise Imaging

By Mary C. Tierney, MS Jessica Kania. Featured in Health Imaging, October 2022

Momentum. You feel it when you've got it. And when it lags, you're pushing harder to regain your stride. In radiology, maintaining momentum is core to keeping radiologists, workflow, decision-making and patient care moving forward. An enterprise imaging solution is the orchestrator that's making it happen.

Enterprise imaging directs and ensures that the right images and tools get to the right radiologist at the right time to make the right decisions—enabling radiologists to quickly and easily share their findings to facilitate timely and good patient care. EI is bigger than radiology, but central to maintaining its momentum.

The Sectra Enterprise Imaging System is part workflow engine, part image viewer and part intelligence gatherer. It helps to make radiology reads quick, efficient and effective in challenging times, when many facilities are battling radiologist and staff shortages, burnout, increasing patient volumes as the population ages, and COVID backlogs—all at the same time.

An additional factor that slows radiologists down is exams that are larger and more complex. Physicians often get overwhelmed by “too much” data to dig through and struggles with IT systems that don't communicate well. As consolidation continues among healthcare systems and imaging providers, ever-present tight budgets and cost conversations are concerns, too.

For many radiology teams ready to pack up their PACS and embrace the next phase of the radiology revolution, the time is right to evolve enterprise imaging into more 'ologies than just radiology.

Here's more on exactly how the Sectra Enterprise Imaging solution is satisfying the need for speed from first image to final report—and helping follow patients over time by focusing on efficiency at all steps of the process.

Making work flow and driving usability speeds efficiency of reads and care.

Data is the new medicine, for all physicians, but especially radiologists. To maximize efficiency, each radiologist needs one seamlessly integrated desktop with an intelligent worklist and image viewer; optimized with images and data for his or her eyes and needs; linked to the EMR; and intuitive AI tools with built-in measurement to enhance decision-making and to create precise and actionable reports. Three words come to mind: accuracy, efficiency and speed. Enterprise imaging systems work from within—swiftly, invisibly extending the thought process of the radiologist.

“Speed defines the whole workflow, as does usability,” says Petra Granlund, vice president of global customer success at Sectra. “You're never faster than your weakest link, and that's where true integration and workflow orchestration come in. Having one access point, one enterprise imaging system, is the one source of truth.”

Speed is a lot more than swift image load times. It optimizes the EI system's entire process: requiring fewer clicks and fewer sign-ons, using AI to help streamline worklists and enable radiologists to make more informed decisions quickly. Technology that stays ahead of the radiologist, anticipating his or her next steps. Better organized information and tools allow the radiologist to stay focused on reads and correlate findings. It is that greater attention that brings greater accuracy to guide better patient care. So referring physicians get information more quickly but radiologists also have more time to improve profitability by expanding capacity.

“We focus on brilliant workflows,” Granlund says. “How many clicks before the first image is loaded? How much analysis do you have to do to select the most appropriate cases? How fast can radiologists navigate between currents and priors, and are they confident they are seeing all of them? Do radiologists have lesion tracking and RECIST [Response Evaluation Criteria in Solid Tumors] workflow built in? Can they see the result of AI, and have advanced viz and volume rendering in one application? Can they access many 'ologies like cardiology, orthopedics and pathology—even eye care—in one system? How quickly can they create a comprehensive, data-rich report with key images and how much support does the system give you? That's what defines speed.”

“Speed defines the whole workflow, as does usability. You're never faster than your weakest link, and that's where true integration and workflow orchestration come in.”



Petra Granlund, Vice President of Global Customer Success, Sectra



Optimizing the worklist with AI takes the hassle out of deciding what to read next.

For the radiologist, enterprise imaging automates the incredibly time-consuming process and never-ending question, *What should I read next?*

The answer of what to prioritize is a delicate balancing act that saps time and energy when a radiologist is doing it on his or her own, says Fredrik Häll, vice president of product applications at Sectra.

“As a rad, you’re trying to juggle everything you’re doing and trying to figure out, ‘Is there anything I urgently need to read now?’” he says. “Are there any subspecialty cases that I should read based on my competence profile without missing acute cases?” That’s why having a smart worklist is becoming even more significant, especially as we see subspecialization getting more important.”

The key to getting it right lies in defining “urgent.” AI prescreens images and flags any positive findings, tagging them as high priority and then moving them up in the workflow so that radiologist sees them first. It’s the fully realized vision of man and machine working together.



“You don’t even have to look at the worklist. If you just do the next case, you know you’ll be presented automatically with the most relevant one. Urgent cases move straight to the top.”

Lisa Lindfors, Global Product Manager for Radiology, Sectra



“Essentially, we’re saying to the radiologist, ‘You should look at these first, because our AI found something here,’” says Lindfors. “We’re using integrated AI to help in the imaging space and in terms of organizing the workflow.”

Automatically presenting radiologists with the highest-priority cases in queue not only makes sure that the most important cases get read first, but also helps guard against cherry-picking.

“So many hospitals are so behind on radiology cases ever since COVID that cherry-picking can be devastating to their efforts to catch up,” says Granlund. “It’s incredibly helpful to have the built-in ability to distribute cases in the most efficient way.”

An all-in-one interface, integrated with the EMR, minimizes clicks and distractions.

Imaging decision-making is informed by a complete and accurate picture of the patient as a whole person with a unique history. Thus, an integrated enterprise imaging system recognizes the need to put a patient’s medical history—including both EMR details and lesion tracking—in a single interface with a single sign-on.

Sectra’s AI-powered smart worklists are integrated within the viewer, automatically presenting radiologists with the highest-priority cases. The smart worklist, based on metadata of exams scheduled and what’s come in, also ensures that radiologists who were hired for their subspecialist expertise are directing their talents, and working at the top of their license without having to exhaust their mental energy to choose their next case.

“You don’t even have to look at the worklist,” adds Lisa Lindfors, global product manager for radiology at Sectra. “If you just do the next case, you know you’ll be presented automatically with the most relevant one. Urgent cases move straight to the top.”

“You have the right patient data available in the same systems at the same time with patient context—all automatically synchronized and done in a secure way without compromising security and integrity,” says Häll. “Radiologists can access things like medications, allergies and next appointments through a lookup without having to leave the PACS cockpit.”

One system for everything—there’s the momentum again.

A single system platform for all medical multimedia also busts silos by allowing radiologists to view any and all relevant patient information, including details that would otherwise only be seen by a pathologist.

“Say for breast imaging, you have a biopsy,” says Granlund. “That result goes to the pathologist, but the radiologist can see it in the system. You want the radiologist to be able to view those images side by side with what they’re reading. The only thing you need to do is click on one thumbnail, and the image series will be synchronized to that lesion in all time points.

Immediate access to all priors, no matter if local or enterprise wide, including pathology images detailing lesions and measurements. This all adds depth and breadth, something greatly lacking in the pre-enterprise imaging days. Now, Sectra presents reading radiologists with a well-organized view of the patient’s priors and prior measurements as well, enabled by powerful AI integration.

Through automated lesion tracking, the system enables radiologists to use RECIST to define when tumors in cancer patients improve, stay the same, or worsen during treatment.

“If you have an oncology case where you have a patient with a lot of tumors and you have 10 different prior cases, you don’t want to spend 30 minutes going through all of the patient jackets,” Lindfors says. “You need a smart solution that can highlight the relevant priors for you, and even highlight the previous measurements you or your colleagues did in previous years.”

When measuring lesions from the latest round of images, the common tools that radiologists use every day—simple measurements, orthogonal measurements, ratio measurements, degree of stenosis measurements—are natively integrated in the system. Radiologists can grab them straight from the image window instead of running the risk of losing focus by switching contexts.

“There’s an enormous efficiency gain because the tools and access to the toolsets you need are within the workflow, available either immediately on screen or at most just one click away,” she says.

Built-in integrations allow the radiologist to push out a table of lesion measurements over time directly into the final report, ensuring that pathologists can easily view the same critical range of information as the radiologist.

Final reports include image links, making it easy for the referring physician to see exactly what radiologists are talking about and making sure that everyone is working from a single source of truth. “Having image links probably saves about 9 out of 10 phone calls,” Lindfors estimates. “Not only does that save time, but it prevents the inevitable interruptions that go along with a call.”

And on the increasingly rare occasions that still do require a momentum-arresting phone call, Sectra Enterprise Imaging offers a solution too: a “resume” feature that allows radiologists who need to divert their attention to answer a question about a different case to then jump right back to the exact screen they were looking at before getting interrupted.



“You have the right patient data available in the same systems at the same time with patient context—all automatically synchronized and done in a secure way without compromising security and integrity.”

Fredrik Häll, Vice President of Product Applications, Sectra

“If you’re working on a case and deep diving into the images, and then someone knocks on your door and says, ‘Hey, can you please look at this case?’ or the phone rings because the referring physician has an acute case and wants to discuss it, and then you need to go back to the previous case, the resume feature lets you pick up exactly where you were in that previous workflow,” Lindfors says.

“Radiologists have to shift context all the time, and it makes them lose their flow or lose their focus. So things like the resume tool, which can help them get it back, can really make a difference.”

Integrated chat, together with direct links to images, simplifies communication and provides a single source of truth.

Sometimes small tools bring big gains. Case in point: integrated chat. Radiologists are vocal fans of in-system chat, and so are technologists.

“It seems like such a mundane thing,” Häll notes, “but to have that so intimately integrated, it knows when you’re logged in, when you’re away for a coffee, if you’re part of a certain group—and to be able to send links to cases back and forth, for them it’s a lifesaver.

Industry symposium

Develop a game plan for AI adoption

Q&A session



It saves so much day-to-day frustration, being able to reach out to a colleague to give them feedback for their attendings, to reach out to their tech when they need to convey something about the image quality. Since COVID, we've noticed an increasing need to communicate remotely. The chat is a part of people's patterns now."

The other way integrated chat speeds up the communication process is by offering the ability to send image links for spot-on diagnostics sharing. That way, a radiologist and pathologist can talk about a case without wasting time fumbling around with screen sharing and spending precious seconds telling each other where to look and making sure they're on the same page.

"You can drop in a link to the very same presentation that the current user is looking at," Häll explains. "Physicians prefer it."

Enterprise Imaging delivers continuous upgrades and key flexibilities.

Enterprise imaging systems aren't solid-state software. Standardization with personalized and individual customizations allows each radiologist to define display protocols to act differently depending on the type of study they launch or preselect different tool sets to load along with each type of image.

Upgrades and tweaks are continuous too, thanks to ongoing dialogue with end users and Sectra engineers. Great feedback brings robust features and functions right where radiologists and radiology departments need them.

The Sectra One subscription model means that updates and upgrades are available immediately, with no additional cost.

"We build product twice a year and then most customers choose to be on a 12-month cadence to get upgrades to time that with their EMR upgrades and their other IT system upgrades," Häll notes. "But that's flexible per account."

And as Granlund adds: "When you use our Sectra One subscription model, you always have the newest functionality."

Clear benefits for all stakeholders, from day one, to keep the momentum rolling

True enterprise imaging—a single IT platform that tightly integrates and displays all types of images, videos, and reports with needed tools in an intuitive way—provides a cohesive user experience to increase read speed while helping to increase depth and accuracy. Driving workflow efficiency, improving communication and eliminating the need to jump between applications daily are all game-changing advantages for radiologists and the patients they serve.

With each and every case they read, radiologists walk along a complicated path full of distractions and opportunities to off-road as they head toward their final destination: an accurate finding that fast-tracks the patient to the best possible care options. Sectra's Enterprise Imaging solution maintains that momentum, helping them keep their stride and hasten that journey while lightening their load, every step of the way.

Cloud: This is Enterprise Imaging

By Mary C. Tierney. Featured in Health Imaging, May 2022

Medical images have long lived on legacy spinning disk. But healthcare systems are now leaving behind those on-prem, awkward boxes that require too much real estate, IT support and expense. Cloud is the choice to support enterprise imaging. If it feels like healthcare cloud is everywhere, you're right. And here's what you need to know to do cloud right.

Enterprise imaging powered by a single IT system has changed the business model of medical imaging. To support EI, healthcare systems are now opting for secure, always-on cloud storage paired with fully managed services, at a predictable cost.

Cloud is increasing performance significantly in managing and accessing images as well as data across radiology, cardiology, pathology, orthopedics, ophthalmology and others. It supports the increasing use of commercial and locally developed AI, and inhouse research projects. A fast and secure offsite backbone to manage terabytes and petabytes of data, that's where cloud becomes essential.

Cloud users often bring up words such as application performance, scalable, reliable, immediate access and secure when discussing the clear benefits. Tight integration, agility, usability, better redundancy and distributing data for greater security are mentioned too.

With fully managed cloud services, vendors handle hardware, software, upgrades, scalability and security. That allows the IT staff to focus on value-add tasks such as improving clinical workflows. This simplifies how physicians and IT personnel consume and interact with data. That includes taking full responsibility for storage, servers and a guaranteed cost for cloud infrastructure. To the IT staff, it means they can focus on clinical and operational projects that enhance productivity, care and outcomes systemwide.

"Our information security team had already blessed the Microsoft Azure solution. I wouldn't say it's a one-stop shop, but the existing Sectra-Microsoft partnership made things very simple. It carried a lot of weight into the decision of going forward with the Sectra cloud solution."

Marty Tedlock, Enterprise Technology Architect, John Muir Health



But why cloud? Why now? Skyrocketing image volume and the complexity of managing medical images top the list of reasons, with many more challenges extending from there.

"On-prem is not the way to manage the extremely large image sets from digital pathology, breast tomosynthesis and the imaging case sizes," says Kjetil Nilsen, global commercial director cloud at Sectra. "Healthcare systems also have the need for increased collaboration and data sharing across disciplines, departments and with patients. Cloud brings that. We also see greater use of outpatient imaging and teleradiology too. Both are well suited for a cloud set up. The COVID pandemic also really increased the demand for home reporting and virtual access to data. All of these challenges are pushing people to cloud."



"We were storing a tremendous volume of images on prem, and the issue wasn't just the storage itself. It also was the overhead of the physical storage space, the patching and all the basic care and feeding you need to do for IT infrastructure. And on top of that, of course, any kind of hardware is a potential failure point."

Judy Bartlett, Associate VP for Application Delivery, John Muir Health

Surging image volume was the reason the team at John Muir Health in Walnut Creek, Calif., decided to move to the cloud in 2017. The three-hospital, 1,000-physician healthcare system near San Francisco also needed a reboot to improve cybersecurity, clinician productivity and disaster preparedness based on local threats of earthquakes, fires and power blackouts. [\[5 years into the cloud, John Muir Health is just getting started | Sectra Medical\]](#)



“We could not get our heads around the exploding growth,” recalls Enterprise Technology Architect Marty Tedlock. “We would have half-day exercises with white boards trying to figure out, ‘OK, how much disk space do we have to purchase to stay ahead of imaging just over the next couple of months?’”



Read this article

5 years into the cloud, John Muir Health is just getting started

The data deluge had been building at John Muir Health for some time, he says, but the arrival of 3D breast tomosynthesis made the search for a better solution urgent. Case in point: One 3D mammogram acquired via digital breast tomosynthesis adds about 500MB of image data to a hospital’s storage system. On the high end, a single study can require 3GB of server space. And as Tedlock recalls, “At that point, oh my gosh, I was having heart attacks trying to figure out where I was going to put all this image data.”

His colleague Judy Bartlett, associate VP for application delivery, remembers the tomo-driven growth spurt coinciding with John Muir Health’s ambitious overall growth plans. The health system was adding or expanding one practice, clinic or facility after the next. And they needed to manage all the images on one system.

“We were storing a tremendous volume of images on prem, and the issue wasn’t just the storage itself,” Bartlett says. “It also was the overhead of the physical storage space, the patching and all the basic care and feeding you need to do for IT infrastructure. And on top of that, of course, any kind of hardware is a potential failure point.”

The concern reached the top of the IT division when a storage area network failed. Tedlock recalls the CIO setting a new direction on the fly.

The new direction was cloud, with the organization partnering on cloud and cloud services with Sectra, John Muir’s PACS provider since 2001. “Our information security team had already blessed the Microsoft Azure solution,” Tedlock says. “I wouldn’t say it’s a one-stop shop, but the existing Sectra-Microsoft partnership made things very simple. It carried a lot of weight into the decision of going forward with the cloud solution from Sectra.”

Topping the tipping points

Cybersecurity and data security are big motivators too as ransomware attacks plague hospitals every day—with ever higher financial stakes. In 2021, the cost of a single healthcare breach data rose to \$9.23 million—a \$2.2 million increase over the previous year. It was the 11th year in a row with an increase. (“The 2021 Cost of a Data Breach,” IBM Security and the Ponemon Institute, July 2021.)

“Healthcare providers managing their own data centers are really struggling to keep up-to-date on security systems and the required patching across multiple servers in order to protect themselves from cyberattacks,” Nilsen says. “That’s something we can do much faster and better than they can do on premise—for hundreds or even thousands of applications.”

On the same topic, health systems struggling with recruitment of IT staff with the right knowledge and skills in security is also a factor that has fueled the adoption of cloud.

Cost in terms of total cost of ownership and return on investment are still other reasons healthcare organizations are considering cloud. In fact, Nilsen calls the business case around cloud the most compelling driver for adoption.

“Up until now it’s been difficult to compare the investment of an on-prem solution with cloud,” he says. “Now the pricing model is more straightforward. Providers are beginning to understand and feel confident in the pricing model and how to estimate cost-savings. And the barrier we saw when IT departments felt too much pride to bring in a vendor to manage infrastructure and hardware is gone. There are plenty of clinical projects and strategic initiatives for IT to focus on to create value for the hospital.”

But where to begin?

The cloud conversation should start early in the process of buying new imaging equipment or bringing on additional facilities. And teams need to compare offerings.

“By nature, a cloud solution comes with new value-added benefits and the supplier takes a bigger responsibility,” Nilsen says. “Just comparing costs is not enough. The key is to understand the total value created. You always have the possibility of a hybrid solution where the long-term image archive is stored securely in the cloud, and readily accessible from your on-premises solution. It’s a good first step in a cloud transition as healthcare systems see immediate cost savings and increased scalability of storage. They still have control on prem, they’re only archiving images to the cloud.”

“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, Sectra



Nilsen and his colleague Håkan Ritzen, senior solution architect at Sectra, both agree that conversations about cloud very much depend on the maturity of the clinical and IT leaders’ views. “It comes down to their trust for the cloud and how fast they want to move to it,” Ritzen says. “Some have a gut feeling that cloud is not trustworthy enough. But even that is fading. We ask them: ‘Are you sure you have secured your data?’ Often, they are not sure. Needing to invest in a new hardware solution for their long-term archive—whether it’s full or faulty—is the perfect fit for cloud. And it’s secure.” And as Ritzen adds, “we’re all using cloud servers every day and in our personal lives. So what’s unique to healthcare? Nothing really. From a business perspective, we should be benefitting from cloud for performance, security and scalability with the immense data growth we have in healthcare.”

Industry symposium Security advantages of cloud-based enterprise imaging Q&A session

Technology + services

Confidence in cloud rests on solid technology. The solution John Muir Health chose five years ago combines Sectra’s cloud-based enterprise imaging software and Microsoft Azure, the cloud used by some 95 percent of Fortune 500 corporations. Security is backed by more than 3,500 Microsoft security experts and a \$1 billion+ annual investment in cybersecurity. Sectra also brings 30 years of cybersecurity expertise and focus on critical infrastructure. [\[Enterprise imaging is going to the cloud—but should you go private, public or a hybrid? | Sectra Medical\]](#)

“Security is a cornerstone in the service we provide, and Azure is probably the most secure public cloud out there,” Nilsen says. “With Sectra’s expertise and background in security, and a multi-layered security strategy, we take a holistic and in-depth approach to cloud security. And we can take advantage of state-of-the-art security provided by Microsoft across physical datacenters, infrastructure and operations in Azure.”

Sectra’s cloud offering is a subscription-based software as a service (SaaS) instead of a traditional licensing model. Hospitals have access to the functionality of the system even though applications and data are hosted off-site in a cloud infrastructure. The applications are accessible from various client devices through a web-based interface, via a high speed and low latency connection.



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Håkan Ritzen, Senior Solution Architect, Sectra

The vendor handles all server software and hardware, upgrades and maintenance. They also manage the cloud network, operating systems, databases and storage. Proactive monitoring 24/7, and secure design are also a part, as is a 99.99% guaranteed uptime.

That goes for multiple data centers too. “Availability and resilience are built into the service,” Ritzen says. “Right out of the box, data is synchronously replicated to several data centers within the solution. Cloud services also allow the possibility to have a georedundant solution to another area of the cloud, located in a different area or country.” Sectra’s cloud offering enables a unified consolidation strategy for the whole stack for imaging needs. And that’s just what physicians and clinicians want and appreciate.

“The single biggest thing from a radiologist’s point of view is that the system is now much faster,” says Jim Carmichael, MD, a pediatric radiology and clinical lead for PACS at Guys’ and St. Thomas’ NHS Foundation Trust in the United Kingdom. The organization deployed cloud in 2017. [\[The first NHS PACS in the cloud – faster, safer reporting at Guy’s and St Thomas’ | Sectra Medical\]](#)

“It delivers images quickly,” he says. “The configurability of the system allows us to send imaging to the specific group of sub-specialists who report it. That is a complicated thing to do, but the system is sufficiently configurable that we can do that.”

Driving efficiency, driving performance

Cloud enables care delivery anywhere, anytime, to any patient, at a controlled cost. It’s the path forward in 2022.

Cloud and the services wrapped around it change the way imaging departments work by harnessing control of their vast image volumes and improving access.

The game changer is the way Fredrik Gustavsson, Sectra’s CTO, describes it, in terms of reducing complexity in hardware and software across enterprise imaging. “Hardware refreshes are done, software is managed as a service, so it’s always up to date,” he says. “Healthcare organizations can scale as they need, now and for future growth. We take on the heavy IT lift so internal folks focus on more key parts of medical care.”



When you ask users who’ve paired cloud technology and services, they talk about the ease of transitioning quickly, “fewer headaches” and greater performance. And few forget to mention the peace of mind that comes from no longer needing to anticipate hardware refreshes and automatic upgrades and updates. Enterprise imaging is always state of the art. The cloud is always growing and scaling so it can accommodate the surge in artificial and augmented intelligence projects; both commercial installs and internal research projects.

“There’s no need to wait for provisioning of hardware to add AI or other ‘ologies,” Gustavsson notes. “We can do very rapid provisioning to bring on new servers and new resources. That alleviates all the friction for end-users wanting to get projects rolling. They can, very quickly.”

“Scalability is nearly unlimited,” Nilsen adds. “Controlling the whole delivery of data, we can change and respond to changing needs quickly. Just like physicians need to respond quickly to patient and other providers’ needs. That’s the true reason organizations are looking to the cloud to solve so many challenges.”

And the benefits they see are real, vast and far reaching. Many healthcare systems are currently adopting enterprise imaging as a cloud service. More still have learned that it’s not just a matter of changing on-prem installations to an external hosting party. The sum becomes greater than its parts with the right combination of cloud, software and a fully managed service—bringing the true benefits of the cloud that the industry has promised healthcare for many, many years.

Ophthalmology: This is Enterprise Imaging

By Jessica Kania. Featured in Health Imaging, September 2022

Sectra has a new vision for eye care: Utilizing a single platform to streamline image viewing, analysis and storage and linking ophthalmology with other 'ologies across the healthcare system. That vision is now a clinically proven reality as one platform unites eye care with other imaging exams across a large, U.S.-based healthcare system. Ophthalmologists and optometrists praise the solution for proving its value in eye disease diagnostics, care planning and patient outcomes—and in October, other healthcare systems can take advantage of it too.

Today, most eye care providers use imaging technology that's highly fragmented; a single physician has to use several different systems—logging into each one of them—to view images and reports to advise on patient care. The process is inefficient and causes a lot of frustration. Adding ophthalmology to an enterprise imaging shatters that paradigm, offering all ophthalmic images and reports on a single system, tightly linked with the EMR for easy access.

“When it comes to standardization, ophthalmology is where radiology was 20 years ago,” says Pontus Svård, Sectra's global product manager for ophthalmology. “Most eye care providers are operating in a practice where each imaging modality vendor provides their own storage and viewing software, sometimes even storing data in proprietary formats. It all adds up, resulting in a multitude of isolated applications for reviewing all the different types of information. There's so much room for consolidation.”

Lessons learned from radiology, cardiology and other image-rich specialties, is that physicians were wasting a lot of time working across multiple workstations. They were at a disadvantage when they couldn't access changes in images and data, side by side, over time and confer on images and data with colleagues in an efficient way.

Why has ophthalmology been overlooked for so long when it comes to modern IT architecture? Partly because eye care is more of a “one-stop shop,” Svård notes, where the same department or clinic is responsible for seeing the patient, performing various imaging studies, interpreting the result, and then planning and executing treatment.

But being separate is no advantage and that's why one of the largest U.S. healthcare systems approached Sectra when they needed a new eye care imaging and data management system. The healthcare system was facing end-of-life with its ophthalmic imaging solution. They found the maturity and scalability of the Sectra Enterprise Imaging platform appealing but also recognized a need for strengthening the ophthalmology specific capabilities. Guided by their key clinical users, Sectra managed to close this gap. Today that healthcare organization uses Sectra's Enterprise Imaging solution to manage 1.8 million eye care studies per year.

This momentum is stirring an evolution. As a result of enterprise imaging, ophthalmic imaging is on the verge of an overhaul that will make the field more organized, standardized, and operationally and economically more efficient.

Tools for easy image review

“Our enterprise imaging solution contains more than just image storage and sharing,” Svård says. “It also includes a diagnostic application with operational tools and functions that allow for easy comparison and analysis of images, helping ophthalmologists do their jobs better and faster. And it's scalable for offices, departments and healthcare systems.”

Here are some of the most utilized tools and features for common ophthalmic imaging modalities available in Sectra Ophthalmology Imaging:

- **Optical coherence tomography (OCT).** OCT scans are presented as a scrollable stack together with a smaller fundus image with reference lines for orientation. Retinal images also allow a higher axial resolution, making it easier for physicians to see and analyze the layers within the retina.
- **Fundus photos.** For fundus photos that capture color images of the retina, Sectra Ophthalmology Imaging offers various color adjustment options, including the ability to show individual color channels. Measurement tools make it easy to measure findings to calculate optic cup-to-optic disc ratios, prepare for photodynamic therapy and track lesions over time. Measurements performed in standard compliant ultra-widefield photos will compensate for the large distortion in the periphery caused by the large curvature of the retina.
- **Visual field test.** For visual field tests that look for weakened vision or blind spots across the entire retina, the ophthalmology module offers a tool to quickly assess a patient's progression over time by quickly and easily moving through consecutive images from previous visits.

The diagnostic application also allows ophthalmologists to easily access MR and CT images along with viewing tools, rather than having to go to a separate workstation to view them. They also can view images from niche devices such as ultrasound and corneal topographers can utilize tools to review the output. For all modalities, the eye care provider may lock on the left or right eye to be sure they're consistently focused on just one at a time.



Side-by-side comparison with a single sign-on

When an ophthalmologist wants to review images from two different modalities, Sectra Ophthalmology Imaging allows them to view the images side-by-side on one screen, all with a single sign-on. This is one of the features ophthalmologists have appreciated most: the ability to pull up all relevant images from all modalities in less time, and with fewer clicks.

“In many practices, the first thing an ophthalmologist will do in the morning is to start logging in to all of their different imaging applications,” Svärd says. “If they want to review two different types of studies, they’ll need to flip back and forth between different applications to review them. One enterprise platform and a single diagnostic application changes all of that.”

In addition to reducing complexity, working in a single application also can reduce the chances of human error, Svärd notes. During the time-consuming process of pulling up separate patient files in multiple systems, the chances that an ophthalmologist gets distracted and clicks on the wrong file is greater.

“When you’re looking at five different applications with images and then an EMR, and nothing’s tied together,” he says, “the risk that you’re reporting or reviewing images of the wrong patient is really evident.”

A single diagnostic application also helps facilitate collaboration among physicians on complex cases and treatment plans. “When they’re in meetings together, instead of ‘alt-tabbing’ through a bunch of different applications, they have the images they want to discuss prepared in a suitable layout before they walk into the meeting room,” he says. “Bam, they’re there, as soon as they open the case.”

Monitoring disease progression

In addition to viewing images from all modalities together, Sectra Ophthalmology Imaging also offers comparison views for images from the same modality, which allows eye care providers to easily evaluate change of disease and anatomy over time.

“The providers tell us that viewing prior and current images on the screen together and easily moving to an older comparison prior gives them a better understanding of disease progression or improvement,” Svärd says. “It also serves as an educational tool. Many of our users show images to patients directly, so that they can better grasp any changes in their own condition.”

Conformity to DICOM standards promotes shareability and coordination

All images are securely stored, easy to access, and comply with the Digital Imaging and Communications in Medicine (DICOM) standard—leading ophthalmology’s shift toward DICOM compliance for all imaging modalities.



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Pontus Svärd, Sectra’s Global Product Manager for Ophthalmology

The American Academy of Ophthalmology as well as the National Eye Institute are actively encouraging that trend, and both promote the benefits of standardizing digital imaging in eye care around established DICOM standards. Being interoperable across devices allows for more efficient patient care, simpler coordination of care and easier image sharing, as well as enabling the creation of comprehensive datasets for research and big data analyses and developing algorithms for machine learning and artificial intelligence.

[American Academy of Ophthalmology Leads Call for Ophthalmic Equipment Manufacturers to Standardize Digital Imaging - American Academy of Ophthalmology \(aao.org\)](#)

The effort also is endorsed globally by the American Society of Retina Specialists, the Asia-Pacific Academy of Ophthalmology, the Royal College of Ophthalmologists, and the Royal Australian and New Zealand College of Ophthalmologists.

“Standardization has really kicked off in ophthalmology,” Svärd says. “It’s getting more and more difficult to sell modalities today without at least an option for DICOM support. Most healthcare system leaders are now demanding DICOM compliance when procuring new equipment.”

“We’ve put all of these ophthalmology tools into one platform—the same platform that we use for other imaging fields. So for our installed base, this means that you don’t need any additional infrastructure components. You just scale out your storage and server capacity to handle the additional volume, and you’re good to go. It’s the same client, it’s the same server platform, it’s just an extra piece of functionality.”

Fredrik Gustavsson, Sectra’s CTO



A single system for *all* departments

In addition to DICOM compliance and system consolidation for ophthalmic images, the Sectra Enterprise Imaging solution offers those options for all images across all departments—meaning that a single system can service an entire health network across multiple ‘ologies.

“We’ve put all of these ophthalmology tools into one platform—the same platform that we use for other imaging fields,” says Fredrik Gustavsson, Sectra’s CTO. “So for our installed base, this means that you don’t need any additional infrastructure components. You just scale out your storage and server capacity to handle the additional volume, and you’re good to go. It’s the same application, it’s the same server platform, it’s just an extra piece of functionality.”

Now that ophthalmology has been proven in everyday clinical practice, it’s also being rolled out to other healthcare systems and facilities. It’s a good fit for other large organizations looking to implement a comprehensive enterprise imaging solution that now includes ophthalmology. That’s because the ability to manage an entire organization’s imaging needs in one highly effective platform reduces complexity and costs.

Physician, technology and IT feedback has been very positive along the way. “The most common reactions I hear are ‘fast, intuitive and easy to use,’” Svärd says. “People are often pleasantly surprised at how well the setup goes, how quick it is to get started using the application, and how simple and intuitive it is.”

“Users tell us they appreciate reviewing progression studies and doing comparisons,” he adds. “One calls the coordinated zoom across all imaging studies ‘amazing.’ We appreciate that many physicians tell us their workdays flow more smoothly. They also say access to imaging and patient information is easier, with fewer steps and clicks.”

All of these are the advantages of Sectra Enterprise Imaging, a single platform that provides a holistic patient overview, and now includes ophthalmology imaging. As Svärd says: “Eye care providers and imaging leaders see this as the next-generation.”

Podcast

Let's talk enterprise imaging

Episode #1

Transitioning to brilliant workflows boosts productivity by 30 %



Amy Thompson
Senior Market Analyst,
Signify Research



Dr. Jessica Fried
Abdominal Radiologist and
Imaging Informaticist,
University of Michigan



Dr. Mark Griffiths
Consultant Paediatric Radiologist,
Southampton University Hospitals
NHS Trust



Dr. Martijn Nobel
Radiologist,
Medical Information Officer,
Maastricht University
Medical Center+

Episode #2

Customer-centric development—What's in it for you?



Traci DeForge
Founder and CEO,
Produce Your Podcast



Fredrik Häll
Head of Product Applications,
Sectra



Olof Göranson
Senior User Experience Designer,
Sectra

Episode #3

5 ways AI can elevate your work



Steve Holloway
Company Director &
Principal Analyst,
Signify Research



Nynke Breimer
Global Product Manager,
Amplifier Service and Radiology AI,
Sectra



Dr. Benjamin Fine
Radiologist & Clinician Scientist,
AI Deployment and Evaluation Lab,
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